THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

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See engravings on page 148, vol. II.

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For engravings, see American Gas-Light Journal for June, 1860, page 245. Address the Patentee. JOHN P. KENNEDY. Trenton, N. J.

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See Engravings in American Gas-Light Journal for July 1, 1860, page 280.

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Samples of the above castings can be seen at the Rooms of the American Gas-Light Journal.

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Bienville Parish.

Arcadia,	Loggy Bayou,	Saline,
Brush Valley,	Mount Lebanon,	Salt Spring,
Buckhorn,	Mud Branch,	Sparta,
Iverson,	Ringgold,	Walnut Creek.

Bossier Parish.

Belleview; (c. h.,)	Cotton Valley,	Plainville,
Bistenau,	Filimore,	Rocky Mount,
Bossier Point,	Knox Point,	Sentell's Store,
Collinsburgh,	Orchard Grove,	Tone's Bayou.

Caddo Parish.

Adams,	Cook's Store,	Spring Ridge,
Albany,	Greenwood,	Summer Grove,
Bayou La Chute,	Mooring's Port,	Sunny Side.
	Shreeveport, (c. h.,)	

Calcasieu Parish.

Hamburgh,	Hickory Flat,	Lake Charles.
	Lake Arthur.	

Caldwell Parish.

Alpha,	Castor,	Long Lake,
Augusta,	*Columbia*, (c. h.,)	Mount Pleasant.
	Copenhagen,	

Carroll Parish.

Ashton,	Joe's Bayou,	Oak Grove,
Caledonia,	Lake Providence,	Pecan Grove,
Deerfield,	Monticello,	Vista Ridge.
Floyd,	Oak Bluffs,	

Catahonla Parish.

Aimwell,	Ford's Creek,	Sicily Island,
Casto Springs,	Funny Louis,	Trinity,
Enterprise,	Green's Creek,	White Sulphur Springs.
Finlay's,	*Harrisonburgh*, (c. h.,)	

Claiborn Parish.

Allen's Settlement,	Forest Grove,	Quay,
Argus,	Gordon,	Rose Hill,
Athens, (c. h.,)	Haynesville,	Scottsville,
Cane Ridge,	*Homer*, (c. h.,)	Shongaloo,
Dorcheat,	Lanier,	Sugar Creek,
Flat Lick,	Lisbon,	Wiseville.
	Minden,	

Concordia Parish.

Black Hawk Point,	Flowery Mound,	Tooley's,
Fairview,	South Bend,	Vidalia.

De Soto Parish.

Black Jack,	Kingston,	Pleasant Grove,
Grand Cane,	Logansport,	Pleasant Hill,
Keatchie,	Longstreet,	Red Bluff.
	Mansfield, (c. h.,)	

East Baton Rouge Parish.

Baton Rouge, (c. h.,)	Magnolia Springs,	Plain's Store,
Greenwell Springs,	Manchac,	Stony Point.

East Feliciana Parish.

Clinton,	Oakland,	Woodland.
Jackson, (c. h.)	Port Hudson,	

Franklin Parish.

Boeuff Prairie,	Pullaway,	*Winnsborough*, (c.h.)
Hurricane,	Red Mouth,	Yellow Bluff.
Oakley,	Warsaw,	

Iberville Parish.

Bayou Goula,	Plaquemine,	*St. Gabriel*, (c. h.)
Gross Tete,	Rosedale.	

Jackson Parish.

Brookline,	Timberville,	Woodville,
Douglass,	*Vernon*, (c. h.,)	Wyatt's Cross Roads.
Plankville,	Vienna,	

Jefferson Parish.

Carrollton,	Jefferson,	La Fayette City.
	Kenner.	

La Fayette Parish.

Cote Gelee,	Vermillionville.

La Fourche Parish.

Raceland,	*Thioodeaux*, (c. h.)

Livingston Parish.

Bayou Barbary,	French Settlement,	Ponchatoula,
Benton's Ferry,	Hollywood,	Springfield,
Coelk,	Independence,	Walker.

Madison Parish.

Chickamaw Bend,	De Soto,	Quebec,
Dallas,	Milliken's Bend,	*Richmond*, (c. h.)
	New Carthage,	

Morehouse Parish.

Bastrop, (c. h.,)	Line,	Prairie Mer Rouge,
Ion,	Plantersville,	Tipton.
Lind Grove,	Point Jefferson,	

Natchitoches Parish.

Adaies,	Cloutierville,	Marthaville,
Campti,	Coushattee Chute,	*Natchitoches*, (c. h.)
	Kisatchee,	

Orleans Parish.

Algiers,	Fort Pike,	New Orleans.

Plaquemines Parish.

Balize,	Grand Prairie,	Point Michael,
Buras Settlement,	Jesuit's Bend,	Southwest Pass.
	Point a la Hache, (c.h.)	

Point Coupee Parish.

Alabama Bayou,	Hermitage,	Red River Landing,
Centreport,	Livonia,	The Village,
Cypress Point,	Morganzia,	Waterloo,
False River,	*Point Coupee*, (c.h.,)	Williamsport.

Rapides Parish.

Alexandria, (c. h.,)	Cheneyville,	Lecomte,
Barnwell,	Cotile,	Liberty Creek,
Bear Creek,	Hineston,	Lucky Hit,
Big Creek,	Huddleston,	Spring Creek.

Sabine Parish.

Anacoca,	Dillonsburg,	Nashborough,
Burr's Ferry,	Fort Jessup,	Negreet,
Columbus,	*Mauny*, (c. h.,)	Toro.
	Mill Creek,	

Saint Bernard Parish.

Bienvenu.

Saint Charles Parish.

McCutcheon's Landing,	Taylor,	St. Charles C. H.

Saint Helena Parish.

Amite City,	*Greenburg*, (c. h.,)	Prospect Hill,
Darlington,	Hog Branch,	Robert's Mills,
Dennis Mills,	Kemp's Mill,	Tangapaho.

Saint James Parish.

Cantrelle,	Convent,	Vacherie Road.
	Grande Pointe.	

St. John Baptist Parish.

Bonnet Carre,	Edgard.

St Landry Parish.

Arnaudville,	Big Cane,	Opelousa,
Atchafalaya,	Dunbarton,	Plaquemine Brulee,
Ballew's Ferry,	Grand Coteau,	Pouppeville,
Bayou Boeuf,	Leonville,	Ville Platte,
Bayou Chicot, (c.h.)	Mermenton,	Washington.

Saint Martin's Parish.

Bayou Chene,	Faussee Pointe,	New Iberia,
Breaux's Bridge,	La Place,	*St. Martinsville*, (c.h.)
Chicot Pass,	Myrtle Grove,	

Saint Mary's Parish.

Alligator,	Centreville,	Jeanerett's,
Berwick,	Charenton,	Pattersonville.
Brashear,	*Franklin*, (c. h.,)	

St. Tammany Parish.

Covington, (c. h.,)	Madisonville,	Parkerville,
Lima,	Mandeville,	Sun.
	O'Rourke's,	

Tensas Parish.

Ashwood,	Mound Bayou,	Water Proof.
Kirk's Ferry,	*St. Joseph's*, (c. h.,)	

Terre Bonne Parish.

Houma, (c. h.,)	Laurence,	Tigerville.

Union Parish.

Cherry Ridge,	Lindville,	Shiloh,
D'Arbone,	Marion,	Spear's Store,
Downsville,	Ouachita City,	Union Cross Roads.
Farmersville, (c.h.,)	Pipesville,	

Vermillion Parish.

Abbville,	Grand Chenier,	Perry's Bridge.

Wachita Parish.

Indian Village,	Prevost,	Trenton.
Monroe, (c. h.,)	Spring Place,	

Washington Parish.

Bailey's Mills,	Franklington,	Shady Grove,
Davidson,	Palestine,	Stubb's Mill.
	Roberts,	

West Baton Rouge Parish.

Bruly Landing,	Lobdell's Store.	

West Feliciana Parish.

Bayou Tunica,	Laurel Hill,	*St. Francisville*, (c.h.)

Winn Parish.

Bertrand Prairie,	Louisville,	Saline Mills,
Good Water,	Montgomery,	Wheeling,
Kyishe,	Pine Ridge,	*Winfield*, (c. h.)
	Saint Maurice.	

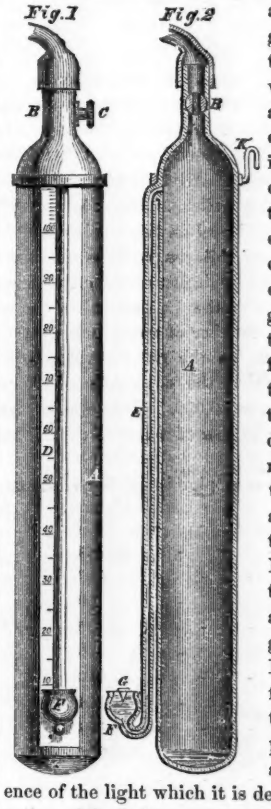
SEWERAGE AND THE PRUSSIAN GOVERNMENT.—A commission from the Prussian government having visited England during the year 1860, to inspect the sewerage works of the metropolis and other English towns, went over, amongst others, Carlisle and West Ham. Mr. R. Rawlinson having afforded assistance, and so facilitated the attainment of the object of the journey, has received a letter signed "Bernstoff," presenting in the name of his Prussian Majesty's government a copy of the work on the church of St. Sophia, at Constantinople, as an acknowledgment of the assistance afforded, showing a satisfactory appreciation of the services rendered. We may suppose that the Prussian government have some idea of moving in sewerage and drainage works.

NOBEL'S PHOTOMETER.

Our readers are familiar with the construction of photometers for the measurement of the illuminating power of artificial light. Their object is to show the relative value of different illuminating agents; and we have dwelt upon the importance of all gas companies making daily use of a photometer in order to maintain a uniform standard quality of the gas they manufacture. We here present an illustration of a photometer contrived by Mr. Nobel, of England, for the purpose of ascertaining and measuring the power of the chemical rays of light.

It is well known that sunlight induces chemical action when certain substances are exposed to its influence. Advantage has been taken of this fact in the construction of this instrument, in the familiar example of a mixture of chlorine and hydrogen gases, which, on exposure to sunlight, unite and form hydrochloric acid. The completeness of the union of the two gases is proportioned to the *actinism*, or number of chemical rays in the light, which may thus be measured.

Fig. 1 *Fig. 2*



The instrument is constructed of a glass tube, A, which communicates by means of a flexible tube, with a reservoir containing equal quantities of hydrogen and chlorine mingled together. E is a capillary tube, communicating with A at the upper part, and with a small cup containing water, F, at its lower end. A small quantity of water is introduced into the lower end of A, for the purpose of absorbing the hydrochloric acid. The mingled gases are allowed to flow into the tube A from the reservoir, by turning the stop-cock B, the cup F being empty during the filling to permit the incoming gases to expel the atmospheric air from the tube A through the small tube E and the cup F. When the atmospheric air is all replaced by the mingled gases, the stop-cock B is closed, the cup F is filled with water, and the instrument is suspended by the hook K, and exposed to the influence of the light which it is desired to measure. The action of the light upon the mingled gases causes them to combine, and the resulting hydrochloric acid is absorbed by the water in the botton of the tube A. As the gases are absorbed, the pressure upon the surface of the water in E is lessened, and the external atmospheric pressure forces the water up the capillary tube E. A graduated scale is attached to the tube E, by which the height of the water column may be ascertained and the force of the chemical rays be measured. The elevation of the water will, in a given time, vary with the intensity of the chemical action of the light upon the mingled gases, and its energy may thus be denoted by the photometer.

WASTE OF COAL IN MINING.—Of the "ten yard," or 30 feet coal vein in South Staffordshire, England, it is estimated that one-third is left in the works as refuse, and the pillars that support the roof occupy one-third, so that not much more than one-third is actually brought to the surface.

THE NEW RIVER WATER COMPANY OF LONDON.—The New River Company of London, England, are now engaged in removing their old aqueducts and reservoirs in different parts of the metropolis, and building on the sites they occupied. During the last few weeks the well-known canal which used to supply the real water to Sadler's Well's Theatre, has been drained dry and filled in, and large iron water-pipes have been placed in its bed. The reservoir in Coppice Row has also been removed.

WATER-WORKS OF AMERICA.

DETROIT, MICH.

The official report of the secretary of the water commissioners for the year ending December 31, 1861, presents some interesting facts, of which we give an abstract. It will be seen that the figures in the tables exhibit a steadily increasing demand.

The whole number of gallons of water distributed during the past year, is 870,036,451, being an increase over the quantity distributed last year, of 87,923,864 gallons.

The number of United States standard gallons of water distributed during the year, and the average daily number of gallons distributed, in the different years from 1852 to 1860, inclusive, is as follows:

YEARS.	YEARLY. NO. OF GALLONS.	DAILY. NO. OF GALLONS.
1852 - - - - -	235,940,271	963,022
1853 - - - - -	303,531,743	831,594
1854 - - - - -	376,265,126	1,030,863
1855 - - - - -	542,807,364	1,487,143
1856 - - - - -	692,124,305	1,891,050
1857 - - - - -	697,090,523	1,909,837
1858 - - - - -	718,091,207	1,981,071
1859 - - - - -	782,112,587	2,142,774
1860 - - - - -	870,036,451	2,383,661

The average daily distribution of water the past year, was 2,383,661 gallons. Assuming the population of the city to be 46,835, as given by the United States Census, the average daily distribution of water to each inhabitant would be 50¾ gallons. But it is generally believed, from estimates based on the number of families, the school census of children, and the number of votes polled, that the population of the city is much greater than that given by the United States Census, and estimating by the number of votes polled at the last November election, on the ratio of votes to the population of other cities, the population of Detroit may fairly be set down at 60,000. This would make the average daily distribution of water to each inhabitant 39¾ gallons.

The total amount of iron pipe in use is as follows:

INTERIOR DIAMETER.	FEET.
30 inches, - - - - -	327
24 " - - - - -	14,384
20 " - - - - -	507
18 " - - - - -	60
16 " - - - - -	1,525
12 " - - - - -	528
10 " - - - - -	17,013
8 " - - - - -	14,704
6 " - - - - -	24,104
4 " - - - - -	116,003
3 " - - - - -	16,004
2 " - - - - -	308
Total,	205,507=38 miles, 4,867 ft.

AMOUNT OF WOODEN LOGS NOW IN USE.

Laid in 1840 and 1841, - - - -	22,779 feet.
" 1841 and 1852, - - - - -	19,917 "
" by the Water Commissioners since 1857,	
3 inches interior diameter, -	43,585 "
2½ " " " - -	45,621 "
Total,	131,902=24 miles, 5,182 ft.
Total pipeage—Iron pipe, - -	38 miles, 4,867 feet.
Wooden pipe, -	24 " 5,182 "
Total,	63 miles, 4,769 feet.

LOG BORING SHOP.

During the year the engine has run 133 hours—and there has been bored, sawed, and reamed, for the works, 13,024 feet of wooden logs.

NEW RESERVOIR.

The stone and brick lining in the east basin was completed, and the water was again let in, on the 1st of June last.

A fence has been erected around the top of the reservoir on the water side of the walk, and a hedge of white cedar has been set around the outer line. A brick sewer has been constructed from the waste-weir of the reservoir to the Russell street sewer. This branch of the works is now regarded as fully completed.

RAIN-FALL, AND HEIGHT OF WATER.

The depth of rain which fell at the city of Detroit, during each month of the year 1860, (snow reduced to water,) observations made by Mr. J. Berry, and the surface of the Detroit river below the water table of the engine house, are as follows:

RAIN-FALL.			Surface of River below water table	
MONTHS.	Inches.	Tenths.	Highest. Feet.	Lowest. Feet.
January,	2	5	3. 5	6.
February,	4	2	5. 7	6. 9
March,	1	5	4. 5	5. 8
April,	3	7	4. 3	4. 9
May,	2	3	4. 1	4. 3
June,	2	5	3. 5	4. 6
July,	5	7	3. 3	4. 1
August,	1	5	3. 5	4. 1
September,	2	.....	3. 7	4. 7
October,	2	3	4. 2	4. 7
November,	2	1	4. 3	6. 5
December,	5	2	4. 2	5. 3
Total,	35	5		

In 1854 the highest water was July 15th, 4.1; the lowest March 3d, 7.0. In 1855 the highest water was Dec. 31st, 2.7; the lowest March 20th, 6.3. In 1856, the highest water was Jan'y 2d, 2.7; the lowest Dec. 18th, 6.0. In 1857 the highest water was Feb. 25th, 3.0; the lowest Jan'y 15th, 5.5. In 1858 the highest water was June 16th, 2.4; the lowest March 15th, 4.9. In 1859 the highest water was Dec. 30th, 3.0; the lowest Nov. 13th, 5.7. In 1860 the highest water was July 6th, 3.3; the lowest Nov. 24th, 6.5.

The quantity of water which has fallen at the city of Detroit in each year, from 1840 to 1860 inclusive, is as follows:

YEAR.	FEET.	IN.	DEC.	YEAR.	FEET.	IN.	DEC.
1840....	3	3	256	1851	4	4	201
1841....	2	9	925	1852	3	11	720
1842....	3	7	989	1853	3	3	872
1843....	3	2	414	1854	4	0	679
1844....	3	11	324	1855	5	11	889
1845....	2	9	439	1856	3	8	750
1846....	4	4	171	1857	4	0	183
1847....	3	6	881	1858	3	4	400
1848....	4	11	594	1859	2	9	650
1849....	3	5	507	1860	2	11	500
1850....	3	4	731	Total,..	76	0	084

The average annual rain-fall for the twenty-one years past, was 3 feet 7.43 inches.

The greatest quantity which fell in any one month during the twenty-one years, was a fraction more than one foot and three inches, in July, 1855, and the least quantity in any month was a fraction more than the sixth of an inch, in February, 1841.

From the year 1840 to 1857, inclusive, the observations were made by the Rev. George Duffield, and since 1857 by Mr. J. Berry.

FINANCE.

The whole amount received during the past year is as follows:

The amount received from ordinary resources, is	54,931 17
The amounts received by loan on bonds, is	50,000 00
Total.....	$104,931 17

The whole amount received from water-rates during the past year was $49,434 90, being $655 86 more than the amount received the previous year.

The whole amount of expenditures of the Board during the past year was $78,971 37, of which $18,957 61 was for reconstructing, enlarging, and extending the works; $14,543 01 was for pumping water, repairs and management of the works; and $45,470 75 was for miscellaneous expenditures, of which $43,836 71 was for interest on the loans. The available balance on hand is $59,141 80.

The entire expenditures of the Board for reconstructing and extending the works, including $24,500 advances on new engine, and deducting $13,180 80 credits, is.....	595,783 45
Balance on hand,.....	61,692 56
Expenditures and balance on hand.....	657,476 01
The total liabilities incurred by the Board are.....	650,000 00
Excess of expenditures for construction and balance on hand, over liabilities incurred.....	$7,476 01
The whole amount paid during the year past for interest on loans, and current expenses over and above credits to same, is	54,997 84
The whole amount received for water-rates is.....	49,434 90
Showing a deficit of.....	$5,562 94

in the receipts to meet the annual current expenses and interest. Extraordinary and unexpected expenditures were required to be made at the engine-house the past season, and further extraordinary expenditures will be required to be incurred there the coming season, for new boiler and repairs on both engines, to render them effective and sure to rely upon to keep up the supply of water. The entire receipts from ordinary resources, since the works have been under the management of the present Board, have exceeded the expenditures for the current expenses, and interest, $7,476. It should be borne in mind that the present works are constructed on a much larger scale than is required to supply the present population of the city, and adequate for at least three times the present population, and that a large sum of the amount received by loan, was expended to provide means of protection against fires, which, so far, is properly chargeable to that branch of the municipal expenses, and not to the water fund, for the reason that this protection is afforded to a large amount of property which does not in any manner whatever contribute to the water fund.

The rates at present charged for water are as low, or lower, than that charged by other works of similar character, and sufficient to meet all expenses properly chargeable to the works. It is undoubtedly wise policy to continue to furnish the inhabitants with water at the lowest possible rate; but as the receipts from rates constitute the only resource to meet the expenses and continue the supply of water, they should at no time be less than sufficient for that purpose, and if such portions of the expenditures as are now paid by the works, which are properly chargeable to other funds, were paid by the city at large, no change in the present established rates would be required.

The works being constructed on a scale to provide for the wants of the next generation, it is but just to the present, to keep the rates as low as possible and meet the present requirements, and rely upon an increase in the uses of water from the works, to increase the annual receipts, which, it is confidently expected, should the works be relieved from the payment of the interest properly chargeable to other branches of the city government, will be sufficient, before the amount of excess of the receipts over the current expenses since the works have been managed by the Board is absorbed, to pay the current expenses and interest, and leave a surplus annually to go into a sinking fund.

The sum of $150,000 has been obtained under the act of the Legislature of February 10th, 1857, and authority is given under said act to loan the further sum of $100,000.

The whole amount of interest received for the money obtained by loans during the period of its disbursement in the construction of the works, is $55,112 69, being seven per cent., the rate paid on the loans.

The whole cost of the main and distributing pipes laid by the Board is $377,222 11, and of the other branches of construction, reservoirs, engine-house, engine, fire hydrants, &c., $231,242 14; total, $608,-964 25; less $13,180 80 credited to the above, leaving the net amount expended for construction, $595,783 45. And the amount expended by the Common Council, before the works were placed under the management of the Board, was $181,015 93, making the total amount expended for construction of the works, $776,799 38.

The whole amount expended by the Commissioners for construction since March 1st, 1852, is	$595,783 45
The value of such parts of the old works now in use, being engines, engine-	

house, tower, distribution pipes, wharf lot, and reservoir lot on Prospect street, is	94,000 00
Present valuation of works	689,783 45
To which add balance on hand	61,692 56
Valuation of the works, and cash on hand	751,476 01
The total liabilities of the works are	650,000 00
Value of the works over liabilities	$101,476 01

During the year permits were issued to one hundred and seventy-nine families to procure water free of charge, on the certificate of the Director of the Poor that they were unable to pay therefor.

There were five hundred and twenty-five water-takers returned by the collectors during the year to be shut off for non-payment of water-rates, a large number of whom promptly paid the amount due, when informed that they were returned; of those shut off, one hundred and twenty-two have paid the amount due, and had the water again let on.

HISTORY AND DESCRIPTION OF THE WORKS.

The reconstruction and enlargement of the works, which have been in progress for the past seven years, may now be regarded as completed, with the exception of the new pumping engine, which, although constructed and set up, has not been accepted and brought into service, and it may not be deemed out of place here to give a brief sketch of the history of supplying the city with water, and a description of the works.

The soil upon which the city of Detroit is built, is underlaid by stiff impermeable clay, extending down to a rock base, and there is not within the limits of the city a well supplied with water from what can be termed a spring, but what few wells there are, are supplied with surface water, which has been found, by analysis, to contain one hundred and sixteen grains of solid matter to a gallon, a great part of which matter is cathartic in its properties.

The present site of the city was occupied by Indian villages at the period of the discovery of the country, in the year 1610. The legitimate settlement of the city, by a white population, was in 1701. To the natives and early settlers, as well as the present inhabitants, the river which rapidly sweeps past the city, was the unfailing source of the supply of water, which was conveyed to their dwellings in casks, hauled in carts, and in buckets slung at either end of wooden yokes which were borne on the shoulders by male and female. The want of a distribution throughout the city of an ample supply of so great an element of life, and comfort, as pure and wholesome water, which is so essential to the health and prosperity of any city, and also to the security and protection of life and property against fire, had long been felt, and the project of supplying the inhabitants with water by means of water-works was agitated at an early day. But nothing decisive was done until 1825, when works were commenced by individual enterprise, and in 1827 the citizens were first supplied with water from them. A company was subsequently organized, who made an effort to obtain a supply of water by boring, and sunk a pipe to the depth of two hundred and sixty feet, and failing to obtain water, the project was abandoned. This company continued to extend their works and made every effort to supply the inhabitants with water in the face of pecuniary loss and the complaints of the public until 1836, when the city purchased the works, and at once projected new works on a larger scale, and their construction was commenced in 1837, which were completed and brought into use in 1841. From this time until 1852, no important improvement or addition had been made to the power or capacity of the works to supply, except an additional engine, while wooden logs had been extended in all directions to an almost indefinite extent, and the nine miles of wood pipe originally laid had increased to thirty-five miles.

These were principally of two-inch bore, and generally connected with a five-eights of an inch lead pipe, and the receipts from water-rates during this time, fell short of meeting the current expenses, and interest, over $85,000. For several years there had been many complaints of an irregular and insufficient supply of water, and it was evident to all that the requirements of the city had outgrown the capacity of the works to supply, and to provide for the future wants of our rapidly growing city, works were required to be constructed on a much larger scale. When the control of the works were placed under their present management, which, in 1853, projected and commenced the reconstruction and enlargement of the works on a scale commensurate with the rapid growth of the city, and sufficient to meet the demand that might be made upon them, to supply at least three times the then present population, a brief description of the work accomplished is as follows:

NEW RESERVOIR.

Four acres of land upon the Mullett farm, between Russell and Prospect streets, north of the Gratiot road, had been purchased by the Common Council in 1851, for the purpose of erecting thereon a new reservoir, which had been, with the other property, transferred to the Board. But the commissioners foreseeing the probable necessity at an early day of a more extensive system of supply, as the population of the city should increase, and after careful examinations and surveys in 1854, purchased ten acres of land on the Dequindre farm, north of the Grafton road, about one and a half miles from the river, being the highest accessible point of land in the vicinity of the city, for the purpose of constructing the distributing reservoir thereon. The cost of the land was $7,363, and it was expected that the lot on the Mullet farm would sell for an amount that would reimburse them for this outlay. The construction of the reservoir was commenced that year, and so far completed as to be brought into use in the fall of 1857, but it was not fully completed until the past season.

The reservoir is constructed in two basins, by raising earth embankments to a height of thirty feet. The embankments are one hundred and three feet through at the base, and fifteen feet at the top. The slopes of the embankment are one and a half feet to one. The inside slopes are lined with a heavy stone wall, topped out with brick. The outside slopes are sodded, a flight of stone steps is built on the inside slope of either basin, from the top of the division embankment to the bottom, a flight of stairs is built on the west side of the reservoir, from the grounds outside, to the top of the terrace; the terrace is graveled and a fence is constructed on the inner side around the basins, and on the outer side a hedge of white cedar has been set. Either basin is two hundred feet square at the top, and one hundred and fourteen and a half feet at the bottom; the two basins cover nearly four acres. The total storage capacity of the two basins is 10,000,000 United States standard gallons. The top water-line is fifty feet above the intersection of Jefferson and woodward avenues, and seventy-seven and a half feet above the river. The esplanade on the top of the reservoir, which is fifteen feet wide and one thousand three hundred feet around the basins, affords a commanding view of the city and surrounding country, and is a delightful promenade for health and pleasure. The water is forced by steam-power from the river into the reservoir, through an iron pipe, twenty-four inches interior diameter, and from thence distributed to the inhabitants by an iron pipe twenty-four inches interior diameter, extending from the reservoir directly to Woodward avenue, connecting with distribution pipes of smaller size at different points. The large main is to extend to Cass avenue and connect with a ten-inch pipe leading to the ten-inch pipe in Michigan avenue, which, when done, will materially increase the effective head of water throughout the city. An eight-inch iron pipe also leads from the reservoir down Orleans street connecting with all pipes on the line to Jefferson avenue. A twenty-four inch pipe is laid through the division embankment of the reservoir, thus connecting the two basins, and will serve to equalize the height of water in them; pipes are also extended through the embankments on the north side of the reservoir provisionary to supply of water to an additional reservoir. Stop-cocks are set in the pipes passing through the embankments, in stone vaults constructed in the embankment, which are reached from the top of the embankment by ladders in chimneys. A waste pipe, a clearing pipe, and a sewer, are laid in the embankment, which is connected with a sewer extending to the Russell street sewer. The average daily consumption of water during the past year, was 2,383,661 gallons, having nearly doubled within the past five years. The capacity of the reservoir, it will be seen, is more than four times this amount. The net cost of the reservoir was $116,287 55, and including the cost of the lot, $123,650 97. The keeper of the reservoir resides on the premises, and the gates are opened to visitors at proper hours, under proper regulations, during the summer season.

NEW ENGINE-HOUSE, BOILER-ROOM, AND CHIMNEY.

The new engine-house, boiler-room, and chimney are erected on the river side of the old engine-house on the wharf, foot of Orleans street. The engine-house is forty-six by twenty-three feet on the ground, the elevation from the surface of ground is sixty-five feet, the extreme exterior height from the bottom of the well to the roof is seventy-three and a half feet, from the bottom of the well to the water-table is fourteen feet, and to the floor of the engine-room is twenty-nine feet, and from the floor of the engine-room to the ceiling is forty-four feet. The section of the building below the engine-house floor, comprising the pump-room and well, is constructed of stone, very solid and massive. The foundations of the whole structure, and the division walls in the well are of massive blocks of stone, five feet in thickness, resting upon two courses of oak timbers, one foot square, running at right angles, resting upon solid sheet piling, driven as far as possible, varying in depth from twelve to fifteen feet. The whole forms the most solid and substantial foundation it was possible to make. The first story from the water-table to the floor of the engine-room is entirely of cut stone, the outer walls are two and a half feet in thickness, and the centre wall, supporting the heavy machinery above, is five feet thick, of solid stone. The walls of the engine-room above the floor are of brick, two feet in thickness, firmly bound together with iron rods and bands. The external appearance of the building represents a building of three stories, though the interior is clear above the first story and is wholly occupied by the engine. The front of the building is relieved by an entrance extending across two-thirds of the front, which furnishes two entrances to the building, between which is a close room, for the protection of the pipe leading from the pump to the reservoir. The windows throughout the building are all full length, reaching to the floors, and have semi-circular caps of stone, with stone casings and sills. The whole building throughout is perfectly fire-proof, the wooden sash and doors being the only wood that enters into its construction. The stone and iron floors are supported by iron girders. Close beside this building, and connected with it by a door, in the centre of the engine-room, is the

BOILER-ROOM.

This building is fifty-six by twenty-five feet on the ground, and twenty-eight feet in height, internally presenting but one story, though externally appearing like a two-story structure; like the engine-house, it is perfectly fire-proof in every respect, the windows and doors furnishing the only wood-work found about it. The walls are of brick, sixteen inches in thickness. Eight and a half feet from the southwest corner of this building, and connected with it by a flue, stands the

STACK OR CHIMNEY,

Consisting of a base and shaft, the whole stretching to a height of one hundred and twenty-eight and a half feet. The first section or base is sixteen feet square and twenty-seven and a half feet in height, surmounted with a stone cap. The sides contain a single panel. The exterior of the shaft is octagon, fourteen and a half feet across at the base, and gradually tapering to ten and a half feet in width at the top. It is one hundred and one feet in height and is surmounted by a heavy iron cornice. The interior is circular in form, and five feet diameter throughout its length. The interior wall is twelve inches in thickness, between which and the wall is an annular air space of five inches, designed to prevent the radiation of heat, and thus to perfect the draft of the chimney. The interior and exterior of the shaft is furnished with flat iron staples or steps, extending the length of the shaft, for the purpose of access to the top. This stack is one of the most beautiful and admirable structures of the kind in the country, completely adapted for the purpose for which it is intended. The face of the walls of the buildings and stack are laid with red pressed brick. The entire cost, in round numbers, of the buildings and stack, in-

cluding the iron stairs, columns, and entabletures in the engine-house, and cast-iron settings and mason work for setting the boilers, is $56,000. The pump-well in the engine-house is supplied with water by an

INLET PIPE,

Of thirty inches interior diameter, made of heavy boiler iron, extending into the river one hundred and fifty feet, the outer end being covered with a double strainer to prevent the passage of any chance floating substance. This end is sunk thirty feet below the surface of the river directly in the channel bed, where the freshest and purest water flows, and entirely beyond the influence of the shore washings. The pipe is protected by a row of piles on either side, filled in with stone. The cost of the pipe and getting it in place was $9,374 42.

MAIN AND DISTRIBUTING PIPES.

The total pipeage in the city is sixty-three miles four thousand seven hundred and sixty-nine feet, varying in size from two and a quarter to thirty inches interior diameter, of which thirty-eight miles four thousand eight hundred and sixty-seven feet are iron pipes, and twenty-four miles five thousand and one hundred and eighty-two feet are wooden logs, of which there was laid by the Board of Commissioners thirty-four miles two thousand two hundred and twenty-seven feet of iron pipe, and sixteen miles two thousand three hundred and twenty-six feet of wooden logs. Total, fifty miles four thousand five hundred and fifty-three feet, at a total cost, in round numbers, of $377,000.

The whole number of fire hydrants set up is two hundred and forty-five, and the whole number of street reservoirs supplied with water from the works, is one hundred and eleven.

The population of the city and the capacity of the reservoirs constructed at the different periods, were as follows:

Years.	Population.	Capacity of Reservoir. Gallons.
1827	2,000	12,010
1830	2,222	22,800
1840	9,100	353,430
1860	60,000	10,000,000

When each of the above reservoirs were constructed, they were deemed ample to supply the inhabitants, and that of 1840 was supposed to make ample provision for the generation to come, and much caution was exercised lest it should be constructed on too large a scale, at which time it was predicted by some that the city would contain a population of 20,000 within the lifetime of some then living; and now, in twenty years, the population has trebled that number, and at the same ratio of increase, the reservoir now constructed will be insufficient to supply the city in less than that number of years. In the construction of water-works for cities, their size and capacity are never over-estimated.

Detroit has now a perfect and economical system of distribution of an abundant supply of water throughout the city. The works being constructed on a scale far greater than the present requirements of its inhabitants, but little more will be required to be done for many years to come, except to extend the distribution pipes, as they may be required, to meet the demands by the extension of the settled limits of the city. The source of supply is unfailing, and the water, which is procured from the beautiful river which sweeps rapidly past the front of the city, drawn from the great northern chain of lakes, is found, by analysis, to be as pure and free from all deleterious substances as any in the world.

The citizens of Detroit have always manifested a deep interest in the construction of these works, to whom all credit is due for the free and glad offering of an enlightened and generous popular patriotism that dictated the construction, and who sanctioned by their approval the heavy outlays necessary for their erection.

The growth and prosperity of any city, whatever its natural advantages otherwise, and however enterprising may be its inhabitants, are largely dependent on the character and purity of the water consumed by its inhabitants, and the abundance of supply. For the diseases, common to large communities, are in a great degree aggravated or mitigated by the quality of the water consumed, and the convenience and comfort of citizens is dependent, in a great degree, on a free and abundant supply. While, for many branches of mechanical and manufacturing pursuits, a large supply of water is indispensable, and without which they could not be established in cities, and however accessible a supply of water may be from wells in densely populated cities, works to supply the inhabitants with water from some large body is indispensable, rendered so by the numerous excavations in the earth for sewers, drains, &c., making it possible for filthy matter to find its way into the sources which supply the wells.

The cost of works of this character must be always large, but none murmur at this when they contemplate the many blessings it brings—the domestic comforts—the protection afforded from the destructive flame—to what degree the ravages of disease have been, and will be restrained, through the universal facilities for cleanliness, personal and municipal, afforded by them.

The annual receipts, from the easy rates fixed by the commissioners, already amounts to about fifty thousand dollars, and should the increase for the future be in the same ratio of the past eight years, it is fair to assume that the investment will be remunerative in dollars and cents, as it has and will in so many other more momentous ways.

MEMBERS OF THE BOARD OF WATER COMMISSIONERS, OF THE CITY OF DETROIT.

EDMUND A. BRUSH, WILLIAM R. NOYES,
ALEXANDER D. FRASER, JULIUS D. MORTON,
JOHN V. RUEHLE.

OFFICERS:

President,
EDMUND A. BRUSH.
Secretary,
ROBERT E. ROBERTS.
Superintendent of Extension and Repairs,
BENJAMIN B. MOORE.
Engineer,
JOHN E. EDWARDS.
Reservoir Keeper,
JACOB L. MUTH.

REPORTS OF GAS-LIGHT COMPANIES.

MILWAUKEE, WIS.

To the President, Board of Directors, and Stockholders of the Milwaukee Gas-Light Co.:

GENTLEMEN,—It again becomes my duty to lay before you our Annual Report for the past year, 1860. It has been unnecessary for us to expend anything of consequence in construction or improvements—the purchase of meters, the addition of about half a mile of main pipe, and a few street lamps, is all I have to report on this head, and the rest is entirely financial.

There have been erected during the past season, by orders of the corporation, nine street lamps; on 1st of January last there were 306, which, with the above, will make a total of 315 lamps at this date.

On the 1st day of January, 1860, there were 1,334 consumers actually burning gas, and on the 31st Dec. last there were 1,379, including those meters used in the city offices and engine houses, being an increase of actual consumers during the year ending 31st Dec., 1860, of 45.

The amount of coal carbonized for the past year, is 6,006,900 lbs., producing 23,995,700 cubic feet of gas, being an average yield of 3 99-100 cubic feet per pound, of which, together with 73,722 cubic feet on hand at last report, 23,948,366 cubic feet were sent out for consumption. Of this amount, 14,839,300 cubic feet have been consumed by private consumers, and 2,869,928 cubic feet by the city for street lamps, engine houses, and offices, showing a deficiency of 26 per cent.; of this amount, 10 per cent. is actual wastage, the balance being condensation, what is used at the works and office, and for re-charging the new gas-holder.

From the statements of accounts appended hereto, you will find the true financial condition of the Company. You will observe a slight decrease in our receipts, as compared with those of the last year, owing to a large fire, by which we lost upwards of forty consumers—but this is almost entirely counterbalanced by the economy we have been enabled to practice in the purchase of coal, and otherwise, and the burnt district is now occupied by consumers of a superior class, and doubtless the receipts for the current year will fully compensate for the losses of the past.

I trust, therefore, my report will meet with your approbation.

All which is respectfully submitted.

E. IRONS, *Secretary.*

Approved and ordered to be printed, 18th March, 1861.

E. IRONS, *Secretary.*

1

CONSTRUCTION ACCOUNT.

Dr.

To balance at last report	326,175 50
" sundries for meters, lead-pipe, stop-cocks, service-pipes, fittings, lamp-posts, castings, labor, &c.	5,151 33
	$331,326 83

Cr.

By old meters returned	594 00
" cash for extra service pipe	1,303 54
" balance of Construction account	329,429 29
	$331,326 83

2

CONSTRUCTION IN ACCOUNT WITH CAPITAL STOCK.

Dr.

To balance of construction at last report,	326,175 50
" do do per 1860	3,253 79
	$329,429 29

Cr.

By amount of capital stock at this date	262,150 00
" do of 7 per cent. mortgage bonds due July 1, 1862	21,000 00
" amount of 8 per cent. mortgage bonds due January 1, 1864	20,000 00
" amount of 8 per cent. mortgage bonds due January 1, 1865	15,000 00
" amount of 8 per per cent. semi-annual bonds	4,000 00
" balance to Dr. of Construction	7,279 29
	$329,429 29

3

MANUFACTURING EXPENSE ACCOUNT.

Dr.

To receipts for gas	59,033 55
" " meter rent	4,504 33
" " lamp-post rent	934 25
" " lighting and extinguishing lamps	931 25
" " forfeited discounts	542 20
" " coke	2,354 96
" " tar	302 09
" " old fire-brick, tiles, &c	148 50
	$68,748 13

Cr.

By cost of coal	14,506 66
" lime for purifying	550 50
" wages	7,948 63
" highwines for meters	444 80
" iron retorts and other castings	1,050 00
" fire-brick and tiles	203 12
" repairs to meters and street lamps	383 76
" taxes	564 05
" law expenses	156 36
" office expenses, salaries, &c	5,414 03
" interest on bonded debt	5,720 83
" lime plates for purifiers	342 44
" sundries	1,216 87
	$68,748 13

4

PROFIT AND LOSS.

Dr.

To discount on $3,002 50, city orders	409 40
" unpaid gas bills	370 65
" law expenses	168 38
" balance to dividend account	29,297 65
	$30,246 08

5

DIVIDEND ACCOUNT.

Dr.

To 5 per cent. dividend, July, 1860.....	13,032 50
" 5 " " January, 1861....	13,107 50
" balance to sinking fund.....	12,014 95
	$38,154 95

Cr.

By balance dividend account, Dec. 31, 1859,	8,857 30
" balance profit and loss, as per No. 4,...	29,297 65
	$38,154 95

BOARD OF DIRECTORS AND OFFICERS OF THE MILWAUKEE GAS-LIGHT COMPANY.

Directors.

E. H. BRODHEAD,
E. CRAMER,
E. D. HOLTON,
President of the Farmers and Millers' Bank.
JOHN G. INBUSCH,
President of the State Bank of Wisconsin.
ALEX. MITCHELL,
President of the Wisconsin Marine and Fire Ins. Bank.
ANSON ELDRED,
M. S. SCOTT,
Cashier of the State Bank.

ELIPHALET CRAMER.....*President.*
M. S. SCOTT.....*Treasurer.*
E. IRONS.....*Secretary.*
J. F. CRAMER.....*Ass't Secretary.*
W. HAYDEN.....*Superintendent*

REPORT ON THE GAS OF THE SURREY CONSUMERS' CO. OF LONDON.—Dr. J. Northcote Vinen's fortnightly report on the gas supplied by the Surrey Consumers' Company is as follows:

Week Ending.	Number of Observat'ns.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
1861.				
May 25,...	4	15.12	12.84	13 84
June 1,....	4	15.08	14.03	14.59

The volume of hydrocarbons was equal to 4 per cent.; carbonic acid, 1 per cent.; sulphuretted hydrogen, none. Ammonia was present on May 22d, 23d, 27th, and on June 1st. Maximum pressure, 2 inches 2-10ths; the minimum 2-10ths. The ordinary working pressure averaged 7-10ths of an inch.

RESULT OF FORTY YEARS' WORKINGS IN THE ANTHRACITE COAL FIELDS OF PENNSYLVANIA.

BY P. W. SHEAFER, ENG. OF MINES, POTTSVILLE, PA.

PROGRESS OF THE COAL TRADE.

	Tons.		*Tons.*
Amount mined in 1820.	365	Am't mined to 1850...	19,513,009
" " to 1830.	359,191	" " to 1860...	59,164,808
" " to 1840.	4,819,751		

Total amount mined in 40 years.....83,856,759

Where Mined.	*Total Tons.*
From the first coal field.....	48,853,801
" second "	12,933,318
" third "	22,069,640
Total.....	83,856,759

The products of the above Coal Fields from 1820 *to* 1860, *and their Avenues to Market.*

From the First Coal Field—	Tons.
1st. Lehigh Canal.....	7,608,042
2d. Philadelphia and Reading Railroad.....	23,797,336
3d. Schuylkill Canal.....	16,718,094
4th. Union Canal.....	1,096,061
5th. Lykens Valley Railroad.....	987,428
6th. Dauphin and Susquehanna Railroad.....	146,100
7th. Lehigh Valley Railroad.....	380
Total.....	50,353,506
Less via Reading Railroad and Schuylkill Navigation Company from Ashland, &c., in the second or middle coal field	1,499,705
	48,853,801

From the Second or Middle Coal Field—	*Tons.*
1st. via Lehigh Canal	8,235,636
2d. via Lehigh Valley Railroad.....	1,685,717
3d. via Reading R.R. and Schuylkill Canal from Ashl'd.	1,499,705
4th. via Shamokin Railroad.....	1,023,318
5th. via Treverton Railroad.....	456,288
6th. via McCauley's Mountain Railroad.....	32,654
Total Second Coal Field.....	12,933,318

From the Third or Northern Coal Field—	*Tons.*
1st. via Delaware and Hudson Canal.....	8,702,978
2d. via Pennsylvania Coal Company's Railroad.....	4,835,469
3d. via North Branch Canal	5,282,165
4th. via Delaware, Lackawanna and Western Railroad.	2,764,437
5th. via Lehigh and Susquehanna Railroad.....	484,591
Total Third Coal Field.....	22,069,640

In a former communication published in the October number, 1858, of the *Merchants' Magazine*, I furnished the areas of the anthracite coal fields of Pennsylvania, as follows, in detail:

First Southern, or Schuylkill Coal Field.	*Sq. Miles.*	*Acres.*
1. East of Tamaqua, mostly covered by the lands of the Lehigh Coal and Nav. Co.....	16	10,240
2. Tamaqua to Pottsville.....	36	23,040
3. Pottsville west to fork of basin.....	55	35,200
4. North Fork, Lykens Valley prong.....	16	10,240
5. South Fork, Dauphin prong.....	15	9,200
6. North Mine Hill range.....	8	5,120
Total area of the First or Southern Field.....	146	93,440

Second, or Middle Coal Field.	*Sq. Miles.*	*Acres.*
Shamokin District.....	50	32,000
Mahanoy.....	41	26,240
Beaver Meadow, Hazleton, Big and Little Black Creek Basins.....	35	22,400
Total.....	126	80,640

	Sq. Miles.	*Acres.*
Third, Northern, Wyoming and Lackawanna Coal Field.....	198	126,720
Total area of the anthracite coal fields.....	470	300,800

We have now shown the area of the several coal fields and the amount of coal exhausted from each. A more difficult task remains, viz., to show the contents of coal in the areas just described.

A solution of this problem is almost impossible, from the fact that if you multiply the thickness by the above areas it will not furnish the cubic quantity, for the reason that the coal beds do not lie in horizontal strata, but vary in their degrees of inclination from 10 to 80 degrees; therefore, the greater the inclination of the coal beds the greater area is covered by them, often so as to double the surface area, but not in the same proportion can you count an increased quantity of coal. Our experience shows us that the steeply inclined coal beds in the red ash districts are generally so crushed and broken as to be almost valueless. The steep inclinations are generally in the north, on which account north dipping coal beds in the red ash region are not generally desirable. We have a remarkable example in the Sharp mountain, which does not show a successful colliery in a distance of 40 miles; its coal beds are nearly vertical.

We illustrated this fact in 1854. Of the 105 collieries then in operation, there were but—

15 north dipping beds, producing..... 175,954 tons.
74 south " " " ..... 1,315,792 "

To keep our estimates of coal quantity on the safe side we will calculate the areas as if horizontal, say 300,800 acres of coal.

The third element is the coal's *thickness.*

This varies in the several coal fields. The nearest approach to the facts is as follows:

The southern coal field embraces the red, white and grey ash coals, averaging 25 yards of coal.

The middle field about 15 yards of coal.

The northern field " 15 " "

Total Coal Areas and Approximate Quantities.

	Less ¼ for working and breaking.
First, Southern Coal Field, 93,440 acres by 25 yards coal's thickness—11,308,824,000 cub. yds. or tons..	5,653,120,000
Second, Middle Coal Field, 80,640 acres by 15 yards coal's thickness—5,854,964,000 cub. yds. or tons...	2,927,482,000
Third, Northern Coal Field, 126,720 acres by 15 yards coal's thickness—9,119,872,000 cub. yds. or tons..	4,599,936,000
300,800 acres. Total, 26,361,076,000 cubic yards or tons, net.....	13,180,538,000
Deduct amount mined in 40 years.....	83,856,759
Balance on hand.....	13,096,681,241

			Acres.	*Tons ℔ Acre.*
Amount mined ℔ acre in the Southern Field..	48,853,801 tons	from	93,440	522 83
Middle "	12,933,318	"	80,640	160 38
Northern "	22,069,640	"	126,720	174 15
Total.....	83,856,759		300,800	278 77

Population of United States.	*Increase.*	*Consumption Tons.*	*Increase. Tons.*
1820..... 9,638,131	.....	365	.....
1830..... 12,866,020	3,227,889	359,191	358,826
1840..... 17,069,553	4,203,453	4,819,751	4,460,560
1850..... 23,191,876	6,122,423	19,513,009	14,693,258
1860..... 31,641,977	8,450,101	59,164,808	39,651,799

This product of 83,856,759 tons of coal is from Pennsylvania alone, whose population in 1860 was 2,916,018.

The whole area of anthracite in Pennsylvania is but 470 square miles, and is all contained in the seven counties of Schuylkill, Carbon, Luzerne, Columbia, Northumberland, Dauphin, and Lebanon.—*Philadelphia North American.*

IRRIGATION AND SEWERAGE AT EDINBURGH.—Some fifty years ago an occupier of land in the village of Restalrig began to cut horizontal outlets for the sewage matter across his meadows; and thus began a system of irrigation which has since been extended over 300 acres—in fact, the whole of the land on the east between Holyrood Palace and the sea. Many successive crops of grass are now annually produced there, which yield an enormous revenue to the proprietors of the soil—the Earl of Moray, and Mr. Millar, of Craigentinney. In the very centre of these irrigated meadows stands the cavalry barracks of Piershill. It has been repeatedly alleged by the inhabitants that this system of irrigation is at once illegal and injurious to the public health. A report of a committee of the police commissioners, now before us, puts the case in the strongest terms. The conterminous proprietors, they say, have no right to the sewage of the city of Edinburgh. But supposing they had, they have no right to create with that sewage a succession of fœtid stagnant marshes, so foul, so nauseous, and so disgusting, that no language can describe them. The cholera of 1832 decimated the inhabitants of Restalrig. The meat in the larders of Piershill could not be kept from rapid decomposition. The health of the troops suffered. Ague, marsh fever, erysipelas, were common diseases in the hospital. It was also asserted that the milk produced by the unhappy animals which are fed on this drainage grass, is in the highest degree unwholesome and unfit for food. With a far deeper import it was broadly insinuated, in the same publication, that the palace of Holyrood was from these reasons a most unsafe residence for her Majesty and the royal family. These allegations were met at the time with a counter statement for the proprietors, from which an impartial observer may discover that there are at least two sides to the question, and that the defenders had not the worst side. The whole controversy has been set at rest by the Royal Commission, who, in their report, have pronounced that the irrigation at Edinburgh is comparatively innocuous, and that with proper precautions it might be made wholly so. We have no great wish to disturb this view of the case; but we think it proper to point out that this report altogether wears more of the aspect of arbitrary assumption than that of calm judicial inquiry. In the meantime, let us point out that the sewage ought, at all events, to be distributed by subsoil drains, as the commissioners suggest in their report, in place of open ditches, as they are at this moment.—*London Builder.*

GAS IN CALCUTTA.—At an ordinary general meeting of the Oriental Gas Company lately held in London, the meeting was congratulated on the steady progress of the company. Upwards of eight miles of mains had been laid during the past year in the streets of Calcutta. The chairman said they were told that the natives did not like gas, that it would interfere with the punkah, and that it could not compete with cocoa-nut oil. Experience had shown, however, that it did not in the least interfere with the punkah; that it was more than three times cheaper than oil; and that fully one third of their customers were natives. Till last year, £200 or £300 was a common price to pay for the introduction of gas into a private house; and the company had a customer on whom the first charge had been no less than £2,000. The directors were now enabled to offer fittings at a price which presented a great inducement to persons to take the gas.

WATER SUPPLY OF LONDON, ENG.—The highest source of the London water-supply on the Thames is Hampton. The population of the valley of the Thames above Hampton is upwards of 700,000, and in very few of the towns in which this population is comprised, have drainage works been carried out.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

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Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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DOMESTIC.

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THE
AMERICAN GAS-LIGHT JOURNAL,

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PROPRIETOR, JOHN B. MURRAY. | EDITOR, C. ELTON BUCK.

MONDAY, JULY 1, 1861.

In no one respect is modern warfare more distinguished from the ancient modes of campaigning, than in the new appliances which are brought to bear upon the various details of military equipment, and which are suggested by the wide diffusion of the laws of science. Although the teachings of science are eminently pacific, and her devotees are mostly men to whom the secluded library, the laboratory, or the peaceful scenes of nature are more familiar than the routine of the tented field, yet we find the various systems of warfare claiming a large meed of attention from those who have been accustomed to pursue other investigations; and experiments with newly invented offensive weapons are conducted with the same precision, and demand the same close application, as characterize the labors of the student while endeavoring to elucidate some cherished theory, or while engaged in the laudable task of rendering some of the abstruse laws of philosophy more plain to the understanding.

It is a well-known maxim among military men, that the more deadly and destructive weapons of warfare are constructed, the more pacific is their ultimate tendency. Notwithstanding this apparent paradox, it is doubtless true, and the records of history afford evidence that since a noted improvement has taken place in the efficiency of field pieces, and other destructive appliances, battles have been marked by a proportionately less effusion of blood, and the comfort of the individual soldier has been more particularly cared for. In the numerous experiments which have been from time to time instituted to ascertain the improved power and range of artillery, economy has also been largely promoted, and a noted saving has been experienced in the quantity of powder employed. By the use of rifled guns almost the entire force of the gases produced by the ignition of the powder, is rendered available, and a far greater range and accuracy of aim is attained. Nor is this all, for a much less charge of powder answers for the same purpose than was formerly used, and thus two important objects are gained at the same time.

But although a number of other valuable improvements have been instituted in offensive weapons, science has also suggested the use of other means which occupy an auxilliary and subordinate position. We refer more particularly to those appliances which are becoming used for purposes of reconnoisance—for daily and nightly observations of the camps and fortifications of the enemy—and which, in other connections, have been before noticed in our columns. Being closely connected with the specialities to which we mainly devote our attention, and promising to be important objects of practical application for other than warlike designs, it is probable that their present use may secure for them an earlier appreciation than would otherwise have happened.

It has already been mentioned in the daily press that Mr. GRANT had visited Fortress Monroe for the purpose of practically testing the power of the calcium light, in making nocturnal examinations of the positions of the enemy, and of obtaining information, from a safe distance, of the various particulars which are important to the opposing commander. It is stated that, using a small paraboloid reflector, the observer, at a distance of half a mile, could distinctly discover the battery on the bank at Newport News, where a portion of the United States army are encamped. As the reflector concentrates all the beams of light, of course the parties making the observation are in total darkness, and but for the proximity of the effulgent rays, no conjecture could be made as to their precise position. A great deal of confidence has been felt by some officials as to the results of these experiments, but the inference seems natural that unless a far greater distance than half a mile can be attained without too much dispersing the rays, or diminishing their brilliancy to too great an extent, a reconnoisance by daylight would be far more effective. In some instances where concealment under cover of night might be adopted by an opposing force for some new movement, the judicious use of the calcium light might be advantageous, but at the distance of half a mile the observer would be in danger, and the light would serve as a target against which the enemy's fire might be directed with success. Although the operator may remain at a distance from the light, and regulate the focus of the reflector with precision, yet a well directed battery could render the whole neighborhood of the reconnoitering party unsafe, and might effectually check any attempts at similar essays. It seems natural, therefore, to conclude that although this light may be used in certain circumstances, yet at times it may prove rather dangerous than otherwise. If the intensity or quantity of the light could be increased and thrown beyond the range of rifled batteries, then great results would be sure to follow its use, but we fear that too much has been claimed for it in the present state of its efficiency.

Other lights have been suggested for the same purpose, and a greater range has been claimed for them than the calcium light. Prof. WAY's electric light, and the magnesium light have each been mentioned as well adapted for throwing an intense flood of luminous rays over a wide expanse of country. One of the principal objections to the former is the power required to produce the requisite current of electricity, which however easily applied where such facilities abound, would be difficult to obtain in the nomadic routine of camp life. The magnesium light is said to excel all others in the brilliancy of its power, and to diffuse rays more nearly resembling those of the sun in actinic strength. This light is obtained in a very simple manner by merely feeding to the flame of an alcohol lamp, a very fine magnesium wire, which, in burning, emits the most intense brilliancy. Two difficulties stand in the way of the regular operation of this light—in the first place it is almost impossible to obtain the magnesium wire drawn of a perfectly uniform thickness. The slightest irregularity in the diameter of the wire, which would be almost imperceptible to the eye, is sufficient to cause an unequal intensity of iluminating power. In addition to this, it is necessary that the wire be fed to the flame with perfect uniformity. This is done by clock work mechanism working with great precision, and should be constructed with the greatest delicacy. At present prices, metallic magnesium is very expensive, being furnished at but little less price than gold; although a greater demand for it would cause a speedy reduction in value.

Gas, by its buoyant power for ballooning purposes, has already been used by opposing armies for making reconnoisances of the enemy's strength, and so great efficiency has been attained by some æronauts in controling their movements, that in the minds of certain sanguine individuals aerial navigation is assumed to be a feasible matter. Be this as it may, it is certain that a more perfect bird's eye view can be obtained of surrounding countries from a balloon, than can be procured by any other means. In the late French and Austrian War, valuable information was received by the aid of æronauts, who ascended to such an altitude as to be beyond the reach of harm, but were enabled to procure an accurate insight into the plans of the defences of the opposing army. Experimental reconnoisances have been already made by sanction of the Government at Washington, by Mr. LOWE, who ascended to the height of 450 feet, accompanied by a telegraphic operator with complete apparatus for transmitting intelligence. The balloon was securely held at this altitude, and a fine insulated wire conveyed the information thus procured, to head-quarters. It is said that the first trial of this system convinced a number of intelligent observers of its entire feasibility, and it may yet be adopted as one of the most efficient means of obtaining intelligence, when other methods are impracticable. This means of making observations of the enemy's position is, in our opinion, more plausible than any other, and we incline to the belief that it possesses far more expediency than any attempts at nocturnal reconnoisance, which have been yet suggested. The opportunity which is now presented for testing the utility of æronautic observations, will, we suppose, be fully improved, and the question as to their importance, which has been for some time in abeyance, will doubtless be settled.

OUR THIRD VOLUME.

This number commences our third volume, and we could wish it had stumbled upon a more auspicious day, but we all have to take life as it comes, and in our case there is no reason why we should complain of past experience—future success is ours to command.

We shall not send the JOURNAL to any but those who order it, and subscribers who wish to continue will remit $3, with their full address, to the

AMERICAN GAS-LIGHT JOURNAL,
No. 39 Nassau Street,
New York City.

PERSONAL.—We have recently had the pleasure of a visit from Mr. HASELTINE, the able and popular editor of the London *American*, who revisits this, his native country, for the purpose of corresponding with his journal on subjects connected with our unfortunate civil war. We tender Mr. HASELTINE our best wishes for the success of his enterprise.

KING BROTHERS' CLAY RETORTS.—Mr. E. W. Barstow, No. 83 Maiden Lane, N. Y., is the agent of these excellent retorts, and is prepared to make contracts with gas companies for their immediate delivery. We recommend Mr. Barstow to the attention of the Northern gas companies, who can obtain any information respecting the retorts by addressing him as above.

REDUCTION IN THE PRICE OF GAS IN ENGLAND.—We still continue to hear of the reduction in the price of gas in many towns of England. At Devizes, the price has been reduced by the Local Improvement Company, from 4s. 7d to 4s. 2d. per 1,000 cubic feet. The profits last year are reported to have been £688, of which £188 were appropriated to the general expenditure of the town.

The Ton Bridge Gas Company have made a reduction in the price of their gas, from 5s. 10d. to 5s. per 1,000 cubic feet.

The Stonehaven Gas Company have also resolved to make a reduction of 4d. per 1,000 cubic feet. The present price being 8s.

ANSWERS TO CORRESPONDENTS.

O. P. Q., of Vt.—*You are right. The calculation is a very simple one, based upon the well-known law—the intensity of light varies inversely as the square of the distance.*

A. B. T., of N. Y.—*The process is a very pretty one, and although it may work well when minute quantities are used, yet on the large scale it will not pay. Besides this, it is not really new, and there is nothing patentable about it.*

E. L., of N. Y.—1. *We should think an average pressure of about one inch sufficient.* 2. *No doubt more gas would be used through the day, during the summer months, for cooking purposes, if a higher pressure were maintained. At present through the day the pressure is so slight, as sometimes to give a very poor flame.*

P. T. J., of N J.—*The earliest English patent connected with the distillation of coal, was granted August 19th, 1681, to John Joachun Becher, and Henry Serle, for "a new way of making pitch and tarre out of pit cole, never before found out or vsed by any other, * * * which being putt into practice may be of great advantage to our subjects in generall."*

A. H. F., of Pa.—*A water which holds in solution only 5 or 6 grains of solid matter, may be considered very pure—unless the salts are in themselves particularly unwholesome. The Schuykill river at Philadelphia, contains about the above quantity, and is considered a very pure stream.*

L. E. X., of Pa.—*We have seen oils extracted from petroleum, whose boiling point was but little above the freezing point of water. Petroleums vary much in composition, even those which are brought from neighboring wells may differ greatly.*

A. Z., of Md.—*Your fears are entirely unfounded, for there is no danger whatever. We are unsparing in our denunciations of burning-fluid, but the oil you speak of, if purchased from the honorable parties you name, may be relied upon with perfect confidence.*

V. A. T., of Ky.—*We advise you to wait a few weeks. A gentleman of this city is engaged in constructing a new form of the apparatus, for which a patent has been applied. It will be a great improvement upon the old pattern, and will almost save its cost in the limited amount of pipe necessary.*

B. S., of Ind.—*We have not received the report this year, but should like to be apprised of the present condition of the company. We will thank you to send us a copy, if you have one to spare.*

J. E. F., of Mo.—*The specimen arrived safely, although delayed on the way. It is not a coal but a slate, much resembling the slates which are found in close proximity to the coal formation. It is not worth having analyzed.*

O. S., of Iowa.—*Charcoal is not really an antiseptic. It does not prevent decay, but by concentrating the evolved gases within its pores, purifies and sweetens the surrounding atmosphere A dead animal placed in charcoal dust, will rapidly decay, but will not emit any noxious smell in consequence of its deoderizing power. Skeletons of small animals are often obtained in this way.*

M. N., of Wis.—*The chemical composition of facts is well known. They are mostly compounds of stearic, margaric, or palmitic acids with glycerin. Chevreul first demonstrated their compound nature, and previous to his investigations they were deemed to be simple bodies.*

Demand for Cheap Gas in Edinburgh, Scotland.—We learn from the London *Builder* that the question of cheap gas having been mooted in the City Council of Edinburgh Scotland, the Lord Provost incidentally stated that he had looked into the Acts of Parliament incorporating the gas companies, and he had ascertained that although there had been a report circulated to the effect that the Town Council had a right to inspect the books of the gas company, there was no foundation for the statement, although there was a provision that, while there was only one gas company in existence, the dividend should not exceed ten per cent.; but as the Council had no statutory right to inspect the booke of the gas company, or to control the dividend, such right had never been exercised.

Ancient Artesian Wells.—Artesian wells were known to the ancients; and of those bored many centuries ago, some are now to be found in the Oasis of Thebes.

Porosity of Cast-Iron.—Cast-iron, when the surfaces left in casting have been cut away by turning or planing, will pass water through its pores, under a pressure of about 7,000 lbs. per square inch.

REMARKS ON GAS FROM WATER, TURF, AND COAL.

BY G. HOWITZ,
Engineer and Manager to the Copenhagen Gas-Works.

(Concluded from page 381, Vol. II.)

In the *Journal für Gasbeleuchtung* there is a notice of Gillard's water-gas at Narbonne, the component parts of which are stated to be:

950 feet of hydrogen, weighing....	4.75 lbs.	
50 " carbonic oxide, ditto....	3.54 "	
454 " carbonic acid, ditto.....	50.55 "	

The total quantity, when freed from carbonic acid, would therefore be 1000 feet. The heat which that quantity of gas can produce in burning is 179,800 units, allowing 171,300 for the hydrogen, and 8,500 for the carbonic oxide; and the amount of heat required for its decomposition would be:

171,300 (hydrogen units)—3870 (units of 1.56 lbs. of coal)—110,000 (units of 13.75 lbs. of carbonic acid).....	57,400 units.
Loss of heat by cooling 1454 cubic feet of gas.....	28,230 "
Total.....	85,630 "

Twenty-six pounds of coal are also used under the boiler, and 79 lbs. under the retort, for the production of 1000 feet of pure gas, making 105 lbs. If we reckon the heating power of the coal at 6000 units of heat per pound, the total number will be 630,000, or equal to the heat produced by 118 lbs of coke. If these results be compared, it will be seen that 1000 feet of impure water-gas, produced by this process I adopted, contains 800 feet of gas freed from carbonic acid, which has a heating power of 136,600 units; therefore, 1000 feet of pure gas would give 170,500 units, and would require the consumption of 15 lbs. of pure carbon in the retort and 112 lbs. of coke in the furnace. Gillard's gas, 1000 feet of which had a heating power of 179,800 units, required the same amount of carbon in the retort, and 118 lbs. of coke in the furnace, assuming the heating power of the coal used at Narbonne to be 6000. It may, therefore, be confidently presumed that no great diminution in the amount of fuel, as above stated to be requisite for the production of 1000 feet of water-gas, can ever be expected.

The next point to be determined, is the cost of purifying water-gas from carbonic acid. When the purifiers are well arranged, I have found that 1 lb. of quick lime absorbs 0.75 lb. of carbonic acid, or 6.24 cubic feet, but it does so only when alkalies are present, for they facilitate the combination of the carbonic acid and lime. This amount of absorption is very nearly the quantity which the lime would absorb theoretically. The following, therefore, is the calculation for the two kinds of water-gas:

The gas, prepared according to Mr. White's process, if all the water be decomposed, will require, for every 1000 feet—

Coke in the furnace.....	112 lbs.
Charcoal in the retort, equal to 15 lbs. of carbon.....	18 "
Lime for purifying.....	37 "

Gillard's water-gas, as made in Narbonne, will require—

Coke in the furnace.....	118 lbs.
Charcoal in the retort.....	18 "
Lime for purifying.....	67 "

I will next consider the production of gas from other substances, especially from common Newcastle coal and from turf, both of which, as well as water-gas, will serve for mixing with gas from common coal. The quantity of fuel required for the production of gas from coal and from turf cannot be determined with the same accuracy theoretically as water-gas, for those processes are more complicated, and involve problems which, so far as I am aware, chemical theories have not yet been able to solve.

The cost of making gas from Pelaw Main and other Newcastle coal is so well known that I need not state it here; but the manufacture of turf-gas is not so generally understood, and the process which I have adopted during the last year is, I believe, entirely new.

In Bavaria, turf is used in large quantities for the manufacture of gas, according to Pettenkofer's process, which consists in the re-distillation of turf-tar, by which means a better result is obtained.

One pound of turf, dried in the air, yields 5.44 cubic feet of impure gas, of the following composition:

Condensed by bromine.....	3.5
Light carburetted hydrogen and hydrogen....	56.5
Carbonic oxide.....	18.0
Carbonic acid.....	22.0
	100.0

The production of 1000 cubic feet of pure gas requires:

Turf.....	236 lbs.
Coke of Pelaw Main coal.....	28 "
Lime for purifying.....	40 "

The turf yields, in addition to the gas, 70 lbs. of turf-coke and 6 lbs. of tar. If we extend Pettenkofer's process, so that the products of the distillation of the turf may pass through glowing turf-coke, which can be readily done by allowing the charred turf from the previous charges to remain in a retort open at both ends, we obtain from 1 lb. of turf 15 feet of impure gas, possessing the following constituents:

Condensed by bromine.....	0.5
Light carburetted hydrogen, and hydrogen.....	58.0
Carbonic oxide.....	28.0
Carbonic acid.....	12.5

To produce 1000 feet of gas, requires of—

Turf, dried in air.....	80 lbs.
Coke.....	36 "
Lime.....	23 "

and the turf yields, besides the gas, 20 lbs. of turf-coke of very bad quality, and a small quantity of tar.

To produce 1o00 feet of gas from Newcastle coal (Pelaw Main), requires of—

Coal.....	224 lbs.
Coke.....	41 "
Lime.....	8 "

and the coal yields, besides the gas, 139 lbs. of coke and 7 lbs. of tar. The gas contains, as is well known, 3.5 per cent. of hydrocarbons condensible by bromine.

It will, now, not be difficult to estimate the cost of manufacture of 1000 cubic feet of each kind of gas, estimating the cost of the materials at the prices in the locality. It must, however, be observed, that the cost of the water-gas, as before stated, is taken at a *minimum*, and on the assumption that some means may be contrived for decomposing all the steam that passes through the retort. The other items of cost are—construction of works, labor, and wear and tear. These can, of course, only be determined by practical working. It is probable that the cost of construction for coal-gas is greater than it would be for water or turf-gas, as a greater quantity of the latter can be made in a retort in a given time than of the former. On the other hand, iron retorts are obliged to be used in the manufacture of water-gas, instead of clay retorts, for the latter are too porous, and are not suitable for working with so great a pressure as is requisite to produce economical results with water or turf-gas. There would not be much difference in the cost of labor; for, although the making of water-gas requires fewer workmen than coal-gas, yet greater skill and care are necessary to insure the best effects, and to prevent the injury which might be caused by a trifling neglect. The wear and tear of the retorts in the production of water-gas must be greater than in making gas from coal, in consequence of the high temperature required, and to the oxidizing action; but there is reason to think that it would be otherwise in the production of turf-gas.

The great practical difficulty in making water-gas is, as already stated, the decomposition of all the water used; for the steam that passes off without being decomposed not only occasions a waste of fuel and time, but it causes also a diminution of the percentage of hydrocarbons in the gas. As a proof that it produces this effect, I will state the results of one of my experiments. From 12 lbs. of Boghead coal and 10 lbs. of water there were made 286 cubic feet of gas, of which 5.6 per cent., = 16 feet, consisted of heavy hydrocarbons, condensible by bromine. But, 12 lbs. of Boghead coal yields 75.4 cubic feet of gas, of which 27 per cent. are condensible, or equal to 20.35 feet of heavy hydrocarbons—thus showing a loss of about 25 per cent. It could, indeed, scarcely be othewise; for, though the steam is highly heated, it has, nevertheless, too low a temperature to be decomposed, and thus some hydrocar-

bon combinations are formed, which become condensed on cooling.

In order to ascertain whether steam could decompose coal-tar at a great heat, I let the steam pass over incandescent charcoal, that had been previously dipped in coal-tar. A gas was thus obtained, consisting of—

Light carburetted hydrogen	30 per cent.
Hydrogen	42 "
Carbonic oxide	18 "
Carbonic acid	10 "

In this experiment, olefiant gas was not obtained, but the component parts of the gas showed clearly that the tar was decomposed.

It is on the decomposition of tar by steam that M. Isoard's process is based. Super-heated and *highly-expanded* steam is brought into contact with the vapor from coal-tar under a high pressure, whereby the latter is decomposed with the production, it seems, of heavy hydrocarbons. Gillard has, undoubtedly, the merit of having decomposed all the steam employed satisfactorily; but whether the increased wear and tear caused by his process will not more than counterbalance its advantage, remains to be proved.

It is evident, from what has been adduced, that water-gas is very costly, and that it cannot compete with coal-gas, either in England or in any neighboring country which can be readily supplied from England with coal; and that there is no probability, looking at the subject from a theoretical point of view, that the cost of its production will ever be reduced to that of coal-gas so long as coal can be procured at the present prices. But, in other countries, where gas-coal is dear and anthracite coal is cheap, water-gas may be economical.

I will now proceed to the consideration of turf-gas. Common turf-gas, it is evident, can only have a limited and local application; for the expense of purifying it, and the great difficulty of preventing the combustion or smouldering of the turf-charcoal, when drawn from the retorts, lessens the economy of the manufacture. Turf cannot be sold on the spot where it is obtained at less than 6s. or 7s. per ton; and as it occupies three times the space of coal, the expense of carriage is very high. Turf-gas, however, possesses greater advantage, when it is made in the manner I have mentioned, by passing the products of distillation over a mass of glowing charcoal, whereby not only the tar, but also the olefiant gas, is decomposed, and a large quantity of gas is obtained from a small quantity of turf, though it does not consist altogether of illuminating gas. The quantity of gas obtained from a pound of turf depends on the mass and on the temperature of the glowing charcoal through which it passes. The more slowly it passes through, the better is the result; but in this consists the difficulty of the operation, when it is conducted on a large scale. At the commencement, turf yields its gas and tar-vapor with great rapidity; and the pressure often equals that of two feet head of water when the gas is exposed to the incandescent charcoal; for this reason, clay retorts are useless. The bursting of the retort is not, however likely, though such an accident might happen; and if, in endeavoring to avoid such an occurrence, the charcoal be packed lightly in the retort, there is a perceptible diminution in the quantity of gas produced. The difficulties are, however, by no means insurmountable, as the operation only requires careful and constant inspection.

The advantages of turf-gas are best seen in comparison with water-gas, which requires for its manufacture much larger quantities of lime and fuel, exceeding considerably the cost of the turf; at least, in most places where the freight of coal is very high.

Turf has the same influence on coal-tar as steam, which is shown in the following experiment with turf soaked in coal-tar. One hundred pounds of turf absorbed 121 lbs. of tar; and 1 lb. of the saturated turf yielded 15 cubic feet of impure gas, consisting of—

Light carburetted hydrogen	70 lbs.
Carbonic oxide	20 "
Carbonic acid	10 "

To make 1000 cubic feet of pure gas required 74 lbs. of tarred turf, and there remained 33 lbs. of coke of excellent quality. Decomposed turf-gas can be combined advantageously with Boghead gas, and produces a better effect from Boghead coal than when it is used alone. The result of one of many experiments will serve to prove this assertion.

Five lbs. of Boghead coal and 15 lbs. of turf produced 160 cubic feet of pure gas, with 10.8 per cent. condensation by bromine; or of the 160 feet of gas, 17.28 were heavy hydrocarbons. Five lbs. of Boghead would have produced 31.4 feet of gas, with 27 per cent. condensation, or 8.48 feet of heavy hydrocarbons, which is about equal to 9.7 feet of olefiant gas. The difference, 17.28—9.7=7·58 cubic feet, may have been derived either by a greater quantity of gas from Boghead or from the turf, or from both. As 160 cubic feet of gas were obtained from the turf and Boghead, and 31.4 cubic feet from the Boghead alone, we may assume the quantity from the turf to have been 160—3.4=128.6 cubic feet. Turf was then distilled and passed through turf-coke, so that there was not produced more than 8.5 cubic feet from every lb., and the gas was found to contain 2·5 per cent. condensible with bromine. This, consequently, gives from 128.6 cubic feet, an amount of 3.2 cubic feet of heavy hydrocarbons. There must, therefore, be thus gained 7.58—3.2=4.38 cubic feet, more from 5 lbs. of Boghead and 15 lbs. of turf than by distilling them alone. Similar results were obtained by distilling Boghead with a kind of brown coal found in Bornholm, which, in its oxygeneous qualities, very much resembles turf.

From the foregoing investigations, it will, I think, be manifest that the following conclusions may be drawn:

1st. That oxygeneous substances, such as water, turf, brown coal, and the like, possess the power of converting condensible hydrocarbon compounds into permanent gases, and, apparently, even into heavy hydrocarbons; but only during the distillation of the coals.

2d. That gas from turf, when decomposed by being passed through incandescent charcoal, yields, in most cases, a far cheaper and more profitable gas for mixing with the rich and heavy gas from Boghead coal than water-gas; and that the latter will never, in all probability, be able to compete with the former, except under special local circumstances.

ON A NEW PROCESS OF OPEN COKING.

By Mr. Samuel H. Blackwell, of Dudley.

All coals divide themselves into one of two classes, bituminous and anthracitic. The first class is again subdivided into caking and non-caking coal. It is only these two varieties of bituminous coal which are ever submitted to the process of coking; in anthracitic coal there is not a sufficient quantity of gaseous matter present to render the process of coking necessary or practicable.

The means employed for coking bituminous coal depend upon whether the coal to be coked is of a caking or non-caking quality. For coking the caking coal, ovens are almost always used. From two to four tons are usually coked at each operation. In the best ovens, the great objects aimed at are:—first, as high a temperature as possible, by heating the air required for the combustion of the gases, previous to its admission into the oven; secondly, the utilization of the heat produced, by carrying the ignited gases under and round the oven before allowing them to pass off; and, thirdly, the admission of the smallest quantity of air necessary for combustion, at such a point in the oven as will best prevent any cutting or wasting action upon the coal, either during the process of coking or afterwards, before the charge is drawn.

In South Staffordshire, and elsewhere, where the coal is of a non-caking quality, open coke fires only have hitherto been used. These consist, in their simplest form, of a brick chimney or open flue, about 4½ to 5 feet high, and about 2 feet diameter inside at the base, and 18 inches at the top; around which the coal to be coked is carefully arranged, air holes being left in the sides of the chimney. The largest and longest pieces of coal are first piled up against the central chimney; against and upon these, other large coals are piled, until they reach as high as the chimney itself; and outside these again, other coals of smaller size, the outside of the coke heap being carefully rounded off with smaller coal or cobbles. The quantity of coal coked in open circular coke heaps varies from 10 to 20 tons, according to the quality of the coal, and the purpose for which the coke is required. When the heap has been thoroughly rounded off, fine coke dust is mixed with water into a sort of paste called "blacking," and with this the whole of the heap is carefully covered, excepting about 6 inches in height at the bottom, which is left open to admit air for the combustion of the coal. Fire is then applied to the top of the coke heap close to the chimney; it gradually spreads along the line of draught down the chimney, and when it has attained sufficient strength, it bursts out at the foot of the heap. As soon as this is the case, and the lowest portion of the heap is sufficiently coked, the bottom of the heap is gradually covered up with dry coke dust, so as to exclude the air and prevent the waste which would otherwise occur. As the fire extends upwards, the blacking gradually burns off higher and higher; and as this takes place, the fresh covering of dry coke dust is also extended upwards, but so as always to leave space enough between it and the unburnt portion of the blacking, for allowing a sufficient quantity of air to enter to complete the coking process, and avoid smothering the coal. When the blacking has burnt of entirely, the covering of new coke dust is made complete, to prevent any further admission of air; the whole is damped down and allowed to cool gradually, and water is then poured into the fire to complete the cooling, and to act, to some extent, as a desulphurizing agent; aqueous vapor always acting more or less in that way when in contact with red-hot coke. The process is now complete, and the coke is drawn for use.

Besides the round coke heap, with one main central chimney or flue, long heaps, with one or more chimneys or flues, are frequently used; but in every modification of size or shape, the same general principles are invariably carried out. The air to support combustion always enters the fire from the surrounding atmosphere, and the products of combustion, in the shape of dense masses of smoke or flame, pass off from the chimneys; there is also always a greater or less extent of surface of burning coal exposed to the air. In fact, no one of the various processes connected with the manufacture of iron, has so great an effect in destroying the general appearance of an iron-making district, and filling the atmosphere with smoke, as the open coke hearths; and hitherto it has seemed as if it were precisely in this department of the manufacture that it is the least possible to get rid of the nuisance.

In consequence of having largely employed the pitch produced in the distillation of coal tar for the purpose of giving a binding or caking property to the non-caking small coal or slack of the South Staffordshire district, the writer's attention was directed to the possibility of collecting the products of combustion from the open coke heaps. It is well known that all bituminous coals give off, in combustion, gaseous products, which yield, by condensation, certain quantities of gas tar and ammoniacal liquor. The quantities of both vary greatly, according to the character of the coals themselves, the more or less perfect condensation of the gases, and the temperature at which the coking process is effected. As a general rule, Cannel coals yield the largest percentage; and with all coals, the lower the temperature during the distilling or coking process, the greater is the quantity of gas tar obtained. A few simple experiments showed the possibility of collecting some of these products from the open coke heaps. A pipe was inserted into the coke heap near the top of the central flue, and its other end brought down into a bucket filled with water. A portion of the products of combustion was at once condensed, and ammoniacal liquor and some small quantity of gas tar were obtained. This experiment was followed by more careful ones, which led at last to the process of open coking now to be described.

In this new arrangement a central chimney or flue is built in the ordinary way for coke heaps. From the bottom of each chimney, a branch pipe, laid about two feet below the surface of the ground, leads off, and delivers into a main pipe running at right angles to it, and passing to condensers, which communicate at one side with a receiver and at the other with a chimney stack. Two dampers are provided for each coke heap, one to close the top of the chimney and the other to close the bent pipe at the bottom. The coals are arranged round the central chimney exactly as in the

ordinary coke heaps; and the heap, when rounded off on the outside, is covered with the ordinary blacking, which is spread over the entire heap, no open margin being left for draft at the bottom, as is generally the case in the open coke heaps. Fire is now set to the heap at the top; the top of the chimney is closed by its damper, thus shutting off all direct communication between the open air and the chimney, and the damper closing the bent pipe is lifted up so as to open a free passage into the pipe. If the draft of the stack connected with the condensers be powerful enough, sufficient air for the combustion of the coal passes through the coating of blacking to the fire; and as combustion goes on in the heap, the gaseous products given off pass into the central chimney, and thence along the branch pipe and main, to the condensers. The main is laid with a slight fall towards the condensers, and is kept cool by a current of water passing over its entire surface; the condensers are also cooled by jets of water allowed to to flow over them.

As soon as the fire is at all advanced, gas tar and ammoniacal liquor begin to flow from the lower end of the main into the receiver. The gases, after leaving the main, pass into the first large condenser and thence into the second, in both of which condensation goes on; and, finally, the uncondensed portions of gas pass off into the stack. From both the condensers ammoniacal liquor and gas tar are collected and flow into the receiver. Condensation in these condensers is facilitated by a series of iron plates placed in them, against which the uncondensed gases strike as they pass onward towards the stack. These means of condensation are very imperfect, and are capable of great improvement, but were adopted as being, at the time, the most convenient. If the draught of the stack be sufficiently powerful, and if the pipes and main are of sufficient area, combustion goes on somewhat more rapidly than in the ordinary coke fire. No smoke, properly so called, is ever visible, except from the top of the stack. No open burning surface is ever allowed to exist, and consequently, even at night, no flame whatever is visible; the blacking never burns off entirely, but as it dries and becomes partially consumed on its under surface, where resting upon the hot coke, it is renewed from time to time—thus preventing any unnecessary waste in the coke heap; and consequently the yield of coke is larger than in the ordinary method of open coking. No greater care is required in attending to the fires than in the ordinary coking, and thus no extra expense is incurred.

In the arrangement of the pipes and main, three points require attention. First, the area of the branch pipes and main must be sufficient for the free passage of the products of combustion. The branch pipes hitherto employed are 12 inches diameter from the chimney to the main, and the main itself is 18 inches diameter; but the first should be at least 15 inches, and the latter 24 inches diameter. Second, the amount of fall, both in the pipes leading into the main, and also in the main itself, must be sufficient to carry off the condensed products as rapidly as they are formed. If this be not the case, the result is, that the gases being partially condensed the moment they leave the chimney of the coke heap, gas tar is produced, which, if it does not pass off at once, is again distilled by the great heat of the branch pipes, and solid pitch is produced, which gradually accumulates and chokes up the pipe. It is, therefore, desirable to have man-holes or lids to these pipes, so that they may be examined and cleared out from time to time. Third, the cooling of the main by a stream of water flowing over it. To effect this the main is laid in an open brick culvert, which is kept filled with a current of water. It is desirable to have man-holes on the main also, so as to be able to examine it at any time; but if properly cooled by water, and laid with sufficient fall, it will keep clear without any attention. The water reduces the temperature below that at which re-distillation of the liquid products of condensation can take place, and consequently no solid products can be formed to block up the main itself; but this depends altogether upon the main being kept properly cooled.

The quantity of liquid products obtainable by the condensation of the gaseous products of coking is very remarkable. It is known that in the process of coking in closed retorts, the gaseous products given off produce on an average, by their partial condensation alone, 20 gallons of gas tar and ammoniacal liquor per ton of coal; and by the imperfect method of condensation from open coke fires, as now described, even a larger quantity of liquid products is obtained. Every ton of coal coked in this manner yields from 30 to 40 gallons of ammoniacal liquor and gas tar; so that in works where 100 tons of coal per day are coked, at least 3000 to 4000 gallons are given off into the atmosphere daily, in the shape of smoke and invisible vapor.

In reference to the value of the products obtained—ammoniacal liquor and gas tar—the first is, of course, from the excess of aqueous vapor just alluded to, weaker than the ammoniacal liquor of gas-works; 750 gallons of the liquor saturate 72 lbs. of sulphuric acid, and produce 112 lbs. of sulphate of ammonia, a quantity which, though small in itself, is yet sufficient to be worth extracting commercially. The value of the second product, gas tar, has not as yet been fully ascertained; the analyses made of it, however, show that its constituents are very different from those of ordinary gas tar, and, apparently, more valuable. It does not contain so much naphtha, but a much larger quantity of the light photogenic oils now so extensively consumed in lamps, and a large quantity of paraffine.

The great variety of hydro-carbon products existing in gas tar, and their great and daily increasing value, owing to the numerous purposes to which they are now being applied, render any new means of obtaining them upon a large scale a subject of much interest. From them are now obtained naphtha, creosote, photogenic oils of light specific gravity, admirably adapted for consumption in lamps, heavier oils for lubricating purposes, and paraffine, which is used as a substitute for wax in the manufacture of the best candles. Besides these, benzole and other compounds have recently been obtained, and are now employed largely in the production of the beautiful colors, mauve and magenta, which have been so much used in dyeing during the last two or three years. So rapidly have the purposes to which these hydrocarbon products are applicable been extended, that pitch, which was previously considered worthless for chemical purposes, and had accumulated at chemical works as refuse waste, has during the last two years come so much in demand, that it was its advancing price and the increasing difficulty of obtaining it that led to the experiments for collecting the products of combustion from open coke fires. The results show how boundless are Nature's resources, when science discloses the means of utilizing them.—*Newton's London Journal.*

FOREIGN NEWS.

RECENT ENGLISH PATENT.

A patent has been recently granted to Arthur Warner, of London, for *Improvements in the manufacture of iron, steel, copper, lead, tin, zinc, and their alloys, and in the manufacture of coke.* In this invention, certain solid, liquid, and gaseous matters are introduced into the above-mentioned metals while in a fluid state. The gaseous substances are chiefly used for the removal of silica and other earthy impurities from iron and for driving off carbon, sulphur, phosphorus, and other volatile matters, and also for rendering the metal more malleable and tenaceous. These gases—hydrofluoric acid, nitrogen, oxygen, chlorine, hydrogen, and carburetted hydrogen—are evolved and applied to the metal as follows: Packages of strong paper, sheet metal, or other suitable material, containing the proper proportions of the ingredients for the formation of the required gases, are placed in the ladle or vessel, into which the molten metal is run from the blast cupola or other furnace, or in which it is heated, re-heated, or re-melted. These packages are kept at the bottom of the vessel by a suitable arrangement, and on the liquid metal being run in, they discharge their contents, and the gases are evolved.

The gases thus formed pass through the whole body of metal, causing violent ebullition, which continues for a considerable time, until the whole or the greater portion of the impurities in the metal are either volatilized or fused, and rise to the surface as a scum. The impurities in iron being of an earthy or gaseous nature, and varying in their proportions according to the district from whence the ore is obtained, it is important to know their exact proportion and nature before proceeding to deal with them. Taking the iron from Cleveland as a basis, an analysis of which proves it to contain the following average proportion of impurities, viz.: silica, 3.00 per cent.; phosphorus, 1.25; sulphur, 0.25; carbon, 3.25.

In order to effect the complete expulsion of these from the metal, the chemicals are applied in the manner hereafter described, taking care to adjust their portions so that the quantity of gas evolved from each shall be only sufficient to combine with and expel that particular impurity which it is intended to attack without leaving an excess in the metal.

First.—*Hydrofluoric acid gas:* This is obtained from fluoride of calcium by means of sulphuric acid, equal parts of each substance being taken. The gas, when thus disengaged, immediately attacks and dissolves the silica, and also any oxyde of titanium or titanic acid which may exist in the metal, causing it to become alloyed with the iron and greatly improving its quality—a result not accomplished by any other means, except to a small extent in the refining furnace.

Second.—*Nitrogen gas obtained from guano:* This is used for the purpose of combining with a portion of the carbon contained in the iron, so as to form cyanogen. As, however, too large a proportion of this gas renders the metal brittle and steely, it is necessary to be cautious in its use.

Third.—*Oxygen gas:* This is used for the purpose of decarbonizing and cleansing the metal. It is produced from the peroxide of manganese, in powder, by means of sulphuric acid.

Fourth.—*Chlorine gas:* This has the effect of driving off sulphur and phosphorus. It is procured in the ordinary way from a mixture of chloride of sodium and peroxide of manganese, acted on by sulphuric acid.

Fifth.—*Hydrogen and Carburetted Hydrogen Gases:* In all cases where it is desirable to de-oxidize the iron, one of these gases is used. The hydrogen is procured from water, either alone or in combination with sulphuric acid and iron filings or scraps of zinc. The The carburetted hydrogen is procured from coal tar, powdered resin, pitch, powdered coal, bituminous shale, or other substances.

This invention is also applicable to many other substances which may be used to purify iron.

The gases are introduced into the metal as follows:

First.—For the generation of the hydrofluoric acid gas, a bottle or vessel containing sulphuric acid is placed in a cylinder, or hollow case of paper, or sheet metal of the required size. The case or cylinder is then filled up with fluoride of calcium, in fine powder, and the whole hermetically sealed.

Second.—For the production of nitrogen, Peruvian guano is introduced into the case containing the fluor spar in proportions to be determined by the necessity of the case; or, as a substitute, another cylinder, containing liquid blood or urine is employed.

Third.—For producing oxygen, a similar bottle or vessel of sulphuric acid is placed in the case of paper or sheet metal, which is filled with peroxide of manganese in powder.

Fourth.—For evolving chlorine, a similar bottle of sulphuric acid is placed in the case of paper or sheet metal, which is then filled with a mixture of chloride of sodium and peroxide of manganese.

Fifth.—For hydrogen, there is placed in the case a bottle containing water and sulphuric acid, which is surrounded by iron filings or scraps of zinc.

Sixth.—For carburetted hydrogen, the cylinder is filled with powdered resin, pitch, coal-tar, powdered coal, or other suitable substance or composition.

The required number of these cylinders or cases is then packed in a wooden box, which is placed at the bottom of the receiver, into which the molten metal is run; the said box being retained in its position by a perpendicular iron rod running through a bar placed across the top of the receiver, or by a wooden wedge which is a more simple plan and found to be fully as effective. The metal is violently agitated by the passage of the gases through it, and is kept in a state of ebullition for thirty to fifty minutes, according to the quantity acted on. As regards the proportions of the various chemicals used, they must be adjusted to the

nature of the impurities in the iron and the qualities of the metal required.

This process is also used in a similar manner to effect the purification of copper, tin, lead, and zinc.

Coke is rendered free from sulphur by introducing chlorine into the coal while burning. This is accomplished by placing in a wooden box 12 lbs. common salt, 6 lbs. peroxide manganese, and 6 lbs. sulphuric acid, either in a glass or lead bottle. This box and contents are placed inside the coke oven and covered with a charge of coal, which is then lighted at the top. The box is consumed, and the contents being discharged, a large evolution of chlorine takes place. This quantity is sufficient for a charge of one ton of coal.

LEGAL RECORD.

Suit against a Gas Company.

At the General Term of the Supreme Court of New York, on June 18th, the case of *Andres Cassard* agst. *The Manhattan Gas Company* was heard. This was an action to obtain and enforce a permanent injunction against the defendants, restraining them from removing their gas-meter from plaintiff's premises, and also from cutting off his supply of gas.

In January, 1858, the plaintiff, by purchase, succeeded to the possession and occupancy of the segar store, No. 592 Broadway, which at that time was supplied with gas by the defendants. Subsequently the defendants' collector called with a gas-bill, made out against the late occupant, which bill, and another afterwards, the plaintiff paid. The plaintiff avers that at the time of paying such bills he inquired of the collector if it was necessary that the bill should be made out in any other name than that of the late occupant, and that the collector said "No; so long as the bills are paid it is all right."

Thus matters went on until the first of May following, when the plaintiff was served with notice by the company that he must make the usual application for supply of gas, and the ordinary deposit in such cases required to secure the payment of the bill. Plaintiff protested, but asked that his name might be substituted for the late occupant's. The defendants insisted on an original application for supply, and informed plaintiff that unless it was made, as also the deposit, the gas would be cut off and the meter removed.

Plaintiff then obtained a temporary injunction to restrain the defendants from taking such action. But upon the trial of the cause the judgment was in favor of the defendants, the complaint being dismissed. Plaintiff appealed to this Court, contending that the defendants should not be permitted to cut off his gas as long as the bills were regularly paid. Defendants urge, on the other hand, that the plaintiff is not entitled to the benefits of the contract between themselves and the late occupant, and that, in common with all others, he must comply with the rules of the company. The case was argued and decision reserved.

Decline of the Whaling Interest.—It is known that the discovery and extensive manufacture of coal oil has had a most ruinous effect upon the whaling interest. At New Bedford the business has declined about one third during the past three years, and it is believed will decline fully a third more within the present year. More than fifty whalers are lying idle at the wharves, and but one vessel is fitting out at this, the busiest, season of the year. Several have been withdrawn from the whaling business, and others have been recently sold to the Government. Oil, which it costs 60 cents to produce, will now bring but 40 cents; and thousands of casks, which have accumulated while the owners have been holding on for better prices, are stowed away in sheds and covered with seaweed. The same depression is noticeable at Fair Haven and New London, and also at Honolulu, Sandwich Islands. To New Bedford, which has been built up and fostered chiefly by the whale fishery, this decline of the business will be a serious calamity; though the whales themselves will undoubtedly be grateful for the discovery of the oil which is fast superseding that hitherto supplied by themselves.

PATENTS.

UNITED STATES.

1,334.—Joseph Neumann (assignor to G. W. Robertson), of Philadelphia, Pa., for an Improvement in Hydrants:

I claim the case or guard, B, in combination with the upper end of the barrel of a hydrant cock, the said case or guard being constructed and applied to the cock, substantially in the manner described and for the purpose specified.

1,344.—C. Bixler, of Rogersville, Ohio, for Improvement in Water Elevators:

I claim the combination of box, A, chamber, B, and valves, a and c, pipe, C, with the weighted piston, D, rod, E, rope or chain, g, shaft, h, gear wheels, i and k, and crank shaft, m, all arranged in the manner and operating as a whole, for the purpose herein described and shown.

[This invention relates to a method of raising water and keeping the same under a pressure or head, whereby it is forced through pipes to any convenient place for service, whence it can be used at pleasure.]

1,352.—H. G. Crowell, of Roxbury, Mass., for Improvement in Pumps:

I claim the combination and arrangement of the cam wheel, C, arms, E and F, connecting strip, G, ropes or chains, J and K, pulleys, I, L and M, and pump brake, or lever, S, substantially as and for the purpose described.

1,354.—W. Freeman, of Mount Carmel, Conn., for Improvement in Lamps:

I claim, in connection with the draught passages, B B, and ring, E, provided with the deflector, H, the guards or flaps, c c, placed over the openings or perforations, b b, to operate as and for the purpose set forth.

[The object of this invention is to obtain a simple and portable lamp for burning coal oils—one that may be economically constructed and carried about from place to place equally as well as lamps for burning other materials which do not require a glass chimney to insure proper combustion.]

1,357.—H. A. Hall, of Boston, Mass., for Improved Portable Filter:

I claim a portable filter constructed of an india rubber tube, A, perforated cap, B, neck, a, flexible tube, C, and mouth-piece, D, as herein described and shown.

1,358.—Charles Harasythy, of San Francisco, Cal., for Improvement in Portable Water Gas Apparatus:

I claim the combination of the cylinders, e e, with the retort, F, boiler, b, and tube, g, in connection with a stove used to produce gas as well as for heating, cooking and baking, substantially as described and for the uses and purposes set forth.

1,368.—John Jones, of New York City, and A. K. Rider, of Poultney, Vt., for an Improvement in Rotary Pumps:

I claim the two rotary disks constructed with radial and tapering cogs, engaging with each other as described and shown, and arranged in different planes within a tight casing, which is separated into two concentric chambers by divisions, b b', substantially as and for the purposes set forth.

[This invention is a rotary force-pump, wherein a continued rotary motion of two cogged disks, inclosed within a tight casing of a circular shape, are employed to produce the action, and also the forcing power of the pump.

1,369.—G. W. Hirchoffer, of Cincinnati, Ohio, for an Improvement in Apparatuses for Distilling Coal Oil:

I claim, first, In combination with the upright conical retort, D, the grinder, N O, when arranged to rotate in proximity with the heated surface of the retort, for the purpose of pulverizing the coal and securing the contact of the same, in a minutely divided state, with the heated surface of retort, substantially as specified.

Second, The arrangement of the upright retort, D, grinder, N O, and discharge pipe, a, for the purpose of permitting the pulverized and exhausted residuum to escape from the retort by its own gravity.

RE-ISSUES.

81.—Emerson Gaylord (assignee of L. M. Ferry), of Chicopee, Mass., for an Improvement in Hose Coupling. Patented October 7, 1856:

I claim giving to one of the parts, B, a simultaneous, vertical, and lateral movement, substantially in the manner and for the purpose shown and described.

I also claim the combination with each other and with the parts, A B, of the bevel-lipped hood, a a, and bevel-faced flanch, b b, in the manner shown and described.

I also claim constructing the hook, a a, and flanch, b b, respectively with hook and recess, h h', as and for the purpose shown and described.

I further claim the combination with the parts, A B, of the inclined faced flanch, b', staple, c, and wedge, d, in the manner and for the purpose shown and described.

[The object of this invention is to obtain a simple, economical, and efficient hose coupling, one that may be very expeditiously connected, and a perfect water-tight joint formed.]

82.—H. G. Nelson, of Mexico, N. Y., for an Improvement in Water-Wheels. Patented Aug. 28, 1860.

I claim, first, The combination of the polygonal flanged adjustable collars, F F' c, with buckets, G, formed of simple plates of metal or other material forming connections between the said collar and secured to the flanches, c, by bolts, b', all as shown and described, and for the purposes explained.

Second, I also claim the arrangement of the gates, I I, shafts, H H, and sectors, J J, with the shaft, D, vent, C, and case, A, all as shown and described, for the purpose set forth.

[This invention consists in a novel and improved manner of constructing the wheel, whereby a very cheap, simple, and durable wheel, with oblique or tangential buckets, is obtained. The invention also consists in an improved gate, arranged and applied to the scroll to regulate the discharge of the water therefrom and its consequent action on the wheel.]

Things Ancient, Quaint and Rare.

Curious advertisements from the Newport Mercury, November 7, 1758.

Newport, November 7, 1758.

BRoke out of His Majeſty's Goal in Newport, the laſt Day of October, John Shearman, of Portſmouth, Marriner, confined for misdemeanours committed at Hiſpaniola, an Account of which is exhibited by the Preſident. He is thin favoured, ſomewhat Pock-broken, and has a very remarkable cut a croſs his Noſe, the upper Part dented, and the End turning up. Whoever apprehends and conveys him to the Subſcriber, Sheriff of the County of Newport, within thirty Days from the Date hereof, shall receive Twenty Dollars.

George Gardner.

WHereas ſome have reported that the Subſcriber broke Goal, to prevent his Conduct from being inquired into. This may certify, that it was not from any Apprehenſion he was under, that he embraced the firſt Opportunity, to take Leave of a cold, periſhing, loathſome Goal, where he was confined contrary to Law or Reaſon. He is willing to take his Trial, or to anſwer any Complaint made againſt him. John Shearman.

BRoke out of His Majeſty's Goal in Briſtol, the 31st. Day of October, one John Smith. He is ſmall and ſlender, of a light Complexion, the Top of his left Thum off near the Joint. Whoever ſecures him, ſhall be well rewarded by

Nathaniel Bosworth, Sheriff.

BOrrowed about a Month ago, from the Houſe of Mr. James Gould in Newport, a cloth colour'd Great Coat almost new. As the Winter approaches very faſt, the Owner is obliged to take this method to remind the Borrower to return it.

Just imported from AFRICA.
And to be ſold reaſonably, by
Peter James, at his Houſe in Newport,
A Parcel of healthy Negroes, conſiſting of Men, Women, Boys, and Girls.

Imported directly from AFRICA,
And to be SOLD reasonably by
Thomas & Samuel Freebody,
A Parcel of likely Negro Men, Women, Boys, and Girls.

To be Sold at the Town of Providence, by
Edward Arnold,
Cheap for Cash, or Short Credit,
FOur, Four Pounders; Four, Three Pounders; and Two Swivel Guns.

ALL Perſons who have any Demands againſt the Eſtate of John Butts, jun. late of Portsmouth, deceas'd, are deſired to bring in their accounts to Enoch Butts, in order to have them discharged. And thoſe who are indebted to ſaid Eſtate are deſired to make speedy Payment, which may prevent Trouble. Enoch Butts.

Newport Mercury, July 24, 1775.

To be Sold by
PELEG BARKER,
A Lot of land between the brick-market and the Point-bridge, 90 feet front; ſaid lot leads into the Cove, with a large dwelling-houſe and ſhop in the front, one on the wharf with a good ſtore, ſtuble, &c., cheap for caſh: Also a lot of land with a dwelling-houſe thereon, upon Little rest, South-Kingſtown; alſo a lot of land, containing about 14 acres, juſt out of town on the road leading to Briſtol ferry. Said Barker carries on the hatters buſineſs in his uſual place, where his good old cuſtomers, and others, may be well supplied with HATS of any ſort or ſize.

American SNUFF,
To be Sold by
George and Robert Lawton,
MANUFACTURED in Pennsylvania and eſteemed there equal to any imported from Great Britain; it is to be hoped that the publick ſpirit of this colony will not be wanting to promote the uſe of this article, if on trial it ſhould be found to merit it.

More Light Wanted.—It has been of late a matter of much complaint as to the miserable light furnished in the district of the New York Gas-Light Company. The street-lamps are very dim, and in some places seem intended only to render darkness visible, while in stores and offices in the lower part of the city, much trouble is occasioned, and in some instances, lamps and candles have been substituted. If this unwise course on the part of the company be persisted in, it will surely invite opposition in their district, and we may, ere long, hear of the celebrated "Hydrogenated Fuel Company," as a veritable institution, proposing to furnish gas for illuminating as well as heating purposes. There is gross dereliction of duty somewhere, and the company should look sharply enough to their interests to remove all cause of complaints.

Action of Steam on Red-hot Coke.—Messrs. Brande and Cooper, at the Royal Mint of England, ascertained that when steam is passed into a retort containing red-hot coke, at the rate of 15 gallons of water (150 lbs. of steam) to one ton of coke, a great part of the steam escapes decomposition.

Power of Hydrostatic Pressure.—Cast-iron guns and other heavy cast cylinders have been burst with considerable violence, by hydrostatic pressure. In one case, under a bursting pressure of 9,000 lbs. per square inch, a fragment weighing 170 lbs. was thrown to a distance of 21 feet.

Large Pump.—The pump rod of Davy's engine at the Consolidated Mines, in England, is one-third of a mile long and weighs 95 tons. The other rods weigh 40 tons, making a total weight of 135 tons.

Boston, Mass.—Water-works cost $5,500,000. Capacity of reservoir, 80,909,730 gallons. About 15,000,000 gallons of water daily supplied by gravity, distributed through 130 miles of pipe. The cost to consumers averages about .0576 per 1,000 gallons. Use Worthington's meters for large consumers.

Albany, N. Y.—Water-works cost $921,892. Capacity of reservoir, 210,000,000 gallons. Extent of pipe, 46¼ miles. Average daily supply of water, 2,500,000 gallons.

Buffalo, N. Y.—Water-works cost $552,000. Water supplied from the Niagara River. Capacity of reservoir, 15,550,000 gallons. 32 miles pipe in use. Water pumped by steam-power.

Alleghany, Pa.—Water-works owned by the city corporation; built in 1859, at a cost of $380,000. Source of supply, Alleghany river. Capacity of reservoir, 6,500,000 gallons. 3 miles pipe in use.

Altoona, Pa.—Water-works built in 1859, at a cost of $25,600. Capacity of reservoir, 220.000 gallons, supplied from a mountain spring. Water rate, $3 75 to $16 for private dwellings.

Temperature of Water in Deep Mines.—The highest observed temperature of water in the deepest mines of Cornwall, Eng.—1,740 feet—was 96° F.

Malta and Mediterranean Gas Company.—A prospectus has been issued of the Malta and Mediterranean Gas Company, with a capital of £60,000, in £5 shares. It is proposed to purchase the existing gas-works at Valetta, the chief city of Malta, and to erect others for the supply of the three cities of Senglea, Cospicua, and Vittoriosa.

New Gas-Holder in Philadelphia.—A new gas-holder is now in course of erection in the Twentieth Ward, Philadelphia, occupying the whole square between Ninth and Tenth, Diamond and Norris streets, with a front of five hundred feet in Ninth street. This holder, when finished, will measure some one hundred and forty-four feet in diameter, by thirty-four feet high, and will be capable of holding 500,000 feet of gas.

This holder is intended to equalize the pressure of gas in the northern section of the city. A steam-pump is kept in motion night and day pumping the water from the excavation, while some seventy-nine men, masons and laborers, are employed on the works.

The protecting wall of the holder is composed of stone, which will have an inside lining of brick. Some 35,000 perch of stone, and about 300,000 bricks, will be used in its construction. A neat three story brick office has been erected on Diamond street, which is now in course of completion.

Water Privileges of the Thames.—The portion of the river Thames over which the privileges of the London watermen extend is 90 miles in length, from Windsor railway bridge to Yantlet creek, near Southend.

Power of the Electric Spark.—Oxygen and hydrogen explode by the electric spark when mixed with five times their bulk of steam. A mixture of air and carburetted hydrogen requires one-third of steam to prevent its inflammation.

Gas in Wales.—The Swansea, Wales, Gas Company have fixed the maximum price of gas at 4s. per 1,000 cubic feet.

PORTABLE GAS-WORKS.

BUTLER'S PATENT PORTABLE **ROSIN GAS WORKS,**
FOR
Dwellings, Churches, Country Villages,
As well as for Consumers in Large Cities.
JOHN BUTLER,
No. 112 Fulton st. and 15 Henry st., Brooklyn, N. Y.

FOR LIGHTING RAILROAD CARS AND STEAMBOATS ☞ WITH GAS.
The whole process of Filling the Gas-Holders of a Railway Train, requires but Three Minutes.
Apply to the
NEW YORK CAR & STEAMBOAT GAS. CO.,
No. 117 Fulton st., N. Y.

PORTABLE GAS WORKS.—S. T. McDougall's Patent Portable Gas Works, for making Gas from Rosin, Rosin Oil, Coal Oil, Naptha, Grease, etc. These Works combine the latest improvements in gas making, and are guaranteed to be superior to any in market. They are made of all sizes, suitable for either country or city use. No county house is complete without its Gas-Works. Gas Stoves of every description on hand and made to order. For sale by S. T. McDougall, 170 Center St., New York.
Agents wanted in other cities to sell rights or machines.

APPLETON'S IMPROVED GAS-Works, for Factories, Hotels, Dwellings and Towns. The most simple and economical works in use, furnishing a superior light to coal-gas at a cost of one-half a cent per burner per hour. It does not injure trees, or plate, and is not affected by cold. For Circular and Terms, apply to APPLETON & GRAHAM,
56 Washington street, Boston.
For Engravings, see American Gas-Light Journal for April, 1860, page 213.

MARSH'S PATENT ROSIN OR Sun-Light Gas-Works, for Private Dwellings, Hotels, Factories, Railway stations, Sugar-houses, Towns, &c. By the peculiar construction of the Retorts, the largest amount of decomposing surface is obtained in the smallest space. 2d. Gas is manufactured from crude rosin, without the least deposit of carbonaceous matter in the retorts or pipes: thus enabling them to be operated continuously, generating rapidly the best and cheapest illuminating gas obtained from this material. ALFRED MARSH & CO.
241 Broadway, New York.

MARYLAND GAS COMPANY are constantly constructing their superior Patent
PORTABLE GAS-WORKS,
of any capacity, from that required for Private Dwellings, Public Buildings, &c., to such as will supply Cities and Towns, complete in all their parts, for the manufacture of Gas from either Rosin, Oil, Coal, or Rosin.
P. S.—This Company also manufacture a superior article of ROSIN-OIL, especially for Gas purposes. Their experience for the last nine years has secured for them a perfect success of their Gas-Works. Address
Maryland Gas Company, Baltimore, Md.

C. R. WOODWORTH, Manufacturer of
PORTABLE GAS WORKS,
74 WALL STREET, New York City.

UNION WIRE-WORKS.

ROBERT McMURRAY & CO., No. 29 Fulton Street, New York, Manufacturers of Copper, Brass, and Iron Wire Cloth for Gas Works, all kinds of Foundry Riddles, Sieves, and Screens. Improved Wire Window Shades, Wire Bolting Cloth, Duster-Wire, Wire Cloth for fanning machines, Rosin, &c., Locomotive Wire, Fire Guards, Ornamental Wire Work of every description. Patent Improved Wove and Laid made, repaired and designed to order.

HEATING APPARATUS.

JOSEPH NASON & CO., Constructors of Apparatus for Warming Public and Private Buildings by Steam and Hot Water.
Improved Fans for Ventilating Hospitals and other Public Buildings.
JOSEPH NASON,
HENRY R. WORTHINGTON,
No. 61 Beekman street, corner of Gold street, New York.

PLUMBERS & GAS-FITTERS.

LOCKE & CRAIGIE, Plumbers and Gas-Fitters, No. 12 East 20th street, New York.

LOCKE, CRAIGIE & CO., Gas-Fittings, Chandeliers, Brackets, Globes, &c., No. 927 Broadway, New York.
☞ Particular attention paid to country work.

JAMES HELME'S Chandelier and Gas-Fitting Establishment, No. 58 East Thirteenth street, between Broadway and University Place, New York.

BRADBURY M. JOHNSON, GAS-Fitter and Plumber, No. 111 East Eighteenth street, New York.
A large and elegant assortment of Chandeliers, Brackets, &c. Gas-Pipe and Posts made for Gas Companies on favorable terms.

STOP-COCKS, &C.,

DANIEL THOMPSON, Machinist and Manufacturer of Stop-Cocks, Fire-Plugs, &c., for Water-Works, Stop-Cocks, Valves, Drip Pumps, &c. for Gas-Works, No. 133 Elfreth Alley, Philadelphia.

JOSEPH NASON & CO., 61 Beekman Street, corner of Gold Street, New-York, Manufacturers of Wrought and Cast-Iron Pipes, and every description of Steam and Gas-Fittings used by Engineers, Manufacturers, and Gas-Fitters.

Boiler Flues,	Back Pressure Valves,
Steam Boilers,	Steam Traps,
Boiler Pumps,	Steam Whistles,
Steam Pumps,	Gauge Cocks,
Steam Gauges,	Gas Cocks,
Safety Valves,	Gas Meters,
Stop Valves,	Fitters' Tools,
Check Valves,	Proving Pumps,
Governor Valves,	Screwing Machines.

JOSEPH NASON,
HENRY R. WORTHINGTON.

SCIENTIFIC BOOKS.

GAS ENGINEERS' LIBRARY.—A few works indispensable to Engineers, Contractors, and others engaged in the construction of Gas-Works and manufacture of Gas, have been selected, out of a large stock of chemical and other works, and are recommended to the attention of those interested. See page 208, vol. II, of this Journal.
For sale at the Rooms of the American Gas-Light Journal, New York.

GAS WORKS TO LET.

For particulars, address D. CONGDON.
Sag Harbor, June 10th. 1861.

WATER-METERS.

H. R. WORTHINGTON'S Patent Water-Meter.—This Meter combines accuracy, simplicity and remarkable durability, with such ease and certainty of motion, as to offer no appreciable obstructions to the flow of water in the pipes to which it is connected, as it runs and registers upon three inches head, or when delivering the smallest stream. These qualities, with its low cost, have caused its extensive adoption by corporations and individuals, in many of our largest cities.
HENRY R. WORTHINGTON,
61 Beekman street, N. Y.

SPECIAL NOTICE.

FISHKILL GAS-LIGHT COMPANY.
R. B. Cary, *Pres't.* - - Aug. Hughson, *Sec'y.*

THE undersigned Directors of the Fishkill Gas-Light Co. hereby give notice, that neither they, nor the Company, will be held responsible or liable for any debts contracted by any person on its account, unless made through James E. Van Steenbergh, the Treasurer thereof; and all payments to the Company for Gas-bills or anything else, are required to be made to him only.
The Directors intend to conduct the business—as near as may be—on the cash principle, and payments for Gas-bills, due the Company, and bills against it, will be settled on or about the first of each month.
Directors:
Richard B. Cary, H. F. Walcott,
Samuel A. Hayt, Augustus Hughson,
Norris Baxter.
Fishkill, N. Y., August 1, 1859.

ANTI-FREEZING APPARATUS.

FREEZING OF GAS-PIPES.—Walton's Patent Anti-Freezing Apparatus illustrated by Engravings in the American Gas-Light Journal, of Jan. 1, 1861, page 212, is the most simple, durable and efficient of any known process.
See also certificates from Cincinnati, O., and Louisville, Ky. Gas-Works in same number, page 208. Address, JOHN WALTON,
Sup't Gas-Works, Louisville, Ky.

JOHN RUSSELL & CO.,
PATENT TUBE MAKERS,
THE OLD TUBE WORKS, WEDNESBURY, AND THE ALMA WORKS, WALSAL, STAFFORDSHIRE,
69 UPPER THAMES ST., & 5 CHARLES ST., SOHO, LONDON;
AND 35 GRANBY ROW, MANCHESTER, ENGLAND.
The original Manufacturers of WROUGHT-IRON GAS TUBES, and the Inventors of the Lap-welded Tubes for Locomotive and Marine Boilers. All kinds of TUBES and FITTINGS, whether for Gas, Steam, or Water. Galvanized and Composition Tubes. Chandeliers, and every kind of Brass work for Gas and Steam.
STOCKS, DIES, AND TAPS OF ALL SIZES. CAST-IRON PIPE AND GAS-METERS.
All Goods Warranted.

GAS, STEAM, SMOKE,
PURE WATER & SOIL PIPE,
FROM
JOSEPH CLIFF,
Wortley Fire-Brick Works, Leeds, England.
T. W. PARMELE, Agt.,
No. 4 Irving Place, N. Y.

THE
STERLING GAS-REGULATOR,
Improves the Light and Saves a Large Per Centage of Gas.

MANUFACTURED BY THE
WHEELER & WILSON SEWING MACHINE COMPANY.

It is well known that Printers require the best and most brilliant light In proof of the superiority of these Machines over all others, the following New York establishments are using them, and testify to their excellence:—New York Times, New York Herald, New York World, New York Tribune, New York Sun, Journal of Commerce, Courier & Enquirer, Evening Post, The Zietung, Dispatch, Leader, Scientific American, Advertiser and Spectator, Independent, Daily News, Harper's Monthly and Weekly, Transcript, Mercury, Atlas, Life Illustrated, Albion, Spirit of the Times, AMERICAN GAS-LIGHT JOURNAL, Christian Enquirer, Churchman, Church Journal, Christian Advocate, Christian Ambassador, Christian Intelligencer, Observer, Sunday Times, Sunday Courier.

By order of the New York and Brooklyn Common Councils, these Regulators are now used in the City Halls, Police Stations, Markets, and other Public Buildings in both cities.

They are Warranted by the
WHEELER & WILSON SEWING-MACHINE CO.,
505 BROADWAY, NEW YORK.

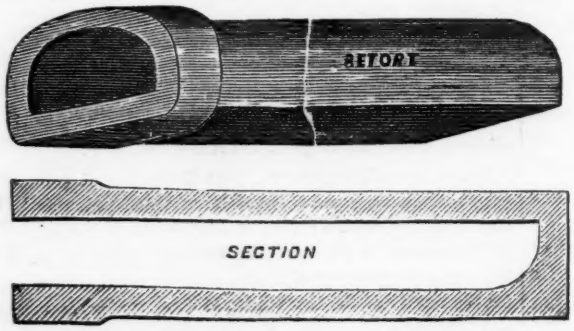
To keep in order, and always maintain the pressurs of the Gas at the lowest point for a brilliant light and economical combustion. They are so constructed that *under no circumstances can the Mercury get into the Meters, or in any way injure them.*

WARREN'S PATENT WATER & ALARM GAUGE,
For Protecting the Flues and Preventing Steam-Boiler Explosions.

This is a reliable High and Low Water Detector, arranged so as to render it one of the best Water Gauges ever attached to a Steam-Boiler; always presenting before the Engineer at sight the exact height of the water, and if, by oversight or by sudden leakage, the water gets low in the boiler, it will cause an alarm before the water gets below the flues, thereby preventing an explosion. This Gauge can be made to alarm at any point desired as a High Water Detector, thereby preventing the water from getting to that height as to be forced into the cylinder of the engine, often causing serious accidents. Thus it is a High as well as a Low water Detector. For sale by

WARREN & BANKS,
153 Centre st., corner of Canal st., New York,
Where a Gauge is constantly in operation.

KING BROTHERS,
STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

Free from Cracks and Correct in Form.

By great care in Manufacturing, combined with the advantages in Burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

RETORT OVENS, FIRE-BRICKS, GUARDS, SADDLES, RABITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS, STOURBRIDGE."

Apply to E. W. BARSTOW, 83 Maiden Lane, New York, where samples can be seen.

HARRIS & PEARSON,
PROPRIETORS OF
Best Glass-House Pot & Crucible Clay.

Manufacturers of Fire-Bricks, Gas-Retorts, and Glass-House Furnace-Bricks of every description.

AMBLECOTE FIRE-CLAY AND BRICK WORKS, STOURBRIDGE, ENGLAND.

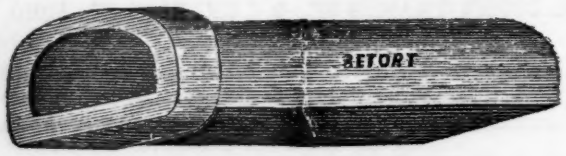
CODE, HOPPER & GRATZ,
1500, 1502 and 1504 FILBERT ST., PHILADELPHIA.

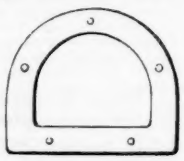
MANUFACTURERS OF

Pressure Registers, Pressure Indicators, Pressure Gauges, Photometers, Governors, Station Meters, Customer Meters, (Wet and Dry,) Experimental Meters (Wet and Dry,) Show Meters, (Wet and Dry,) Meter Provers, Centre Seals, &c.

The high reputation which we have enjoyed for more than twenty-two years, and the fact that we have manufactured a greater number of Gas-Meters than all other manufacturers in this country combined, must present itself as a security to parties desirous of securing the most reliable instruments. Having completed a most extensive addition to our Factory, and added many important improvements to our machinery, we are enabled to fill orders entrusted to us with despatch, and in all cases *guarantee entire satisfaction.* Our Patent Rotary-Valve Dry Gas-Meter is now used by upwards of Two Hundred Gas Companies, giving general satisfaction; we therefore recommend it, believing it superior to any other Dry Gas-Meter manufactured. All Meters tested separately by a sworn Meter-Inspector, and sealed when desired.

COWEN'S PATENT FIRE-CLAY RETORTS.





JOSEPH COWEN & CO.,
BLAYDON BURN, near Newcastle-on-Tyne, England,

Have always been, and are still, the most extensive manufacturers of FIRE-CLAY RETORTS in the United Kingdom, and were the only parties to whom a Prize Medal was awarded at the Great Exhibition, in London, 1851, for

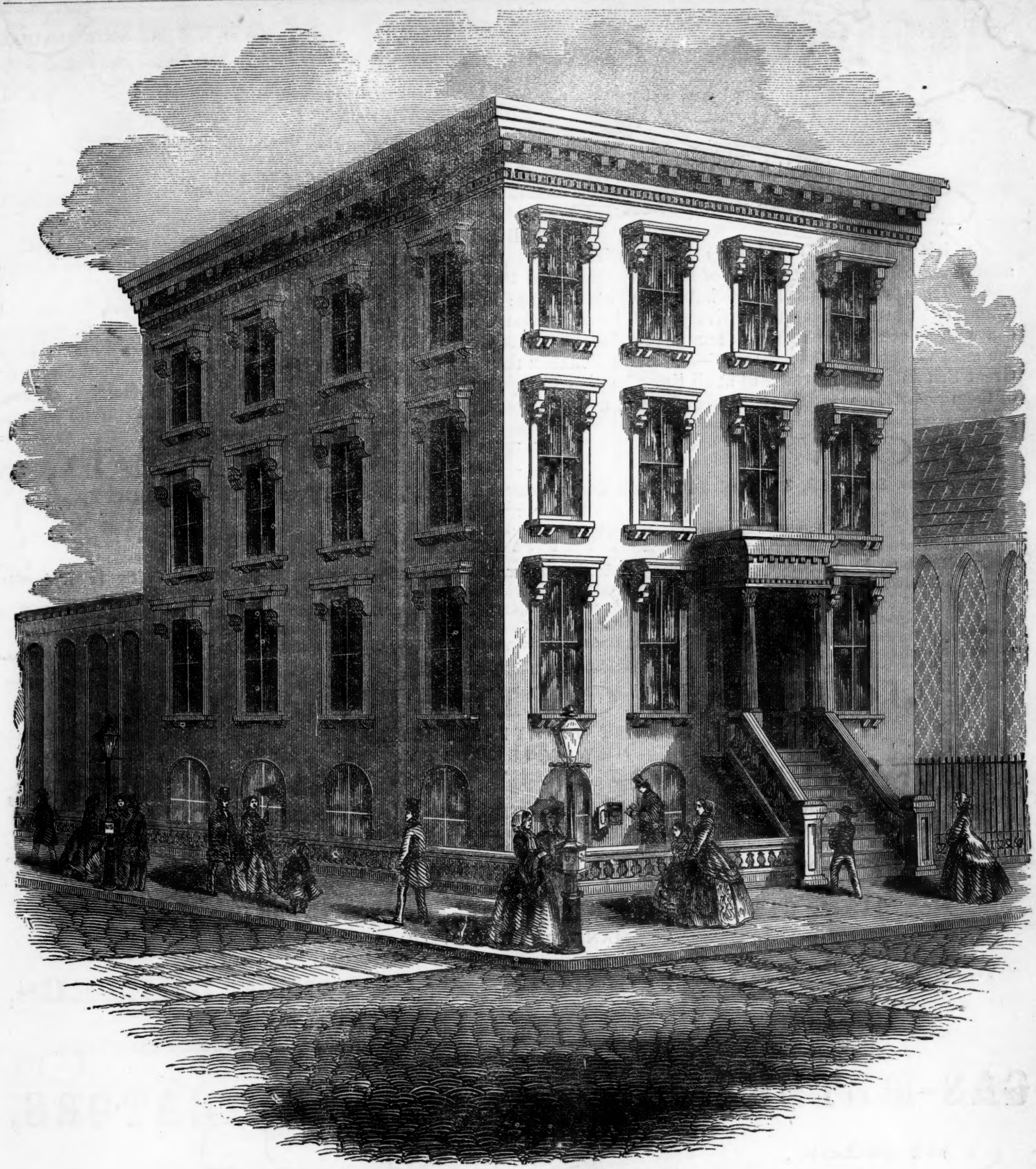
"GAS RETORTS, AND OTHER OBJECTS IN FIRE-CLAY."

J. C. & CO. make Fire-Clay Retorts of all shapes and dimensions, and to fit existing mouth-pieces.

Orders for FIRE-CLAY RETORTS, TILES, BEARERS, and other articles in Fire-Clay, receive immediate attention, and are promptly executed at their Works, as above. Drawings of Settings adapted for Cowen's Patent Fire-Clay Retorts supplied.

AGENTS, MESSRS. MEAD & BELL.
13 CLIFF STREET, NEW YORK.

N. B.—J. C. & CO.'S RETORTS are well adapted for small Gas-Works, as they can be used without an Exhauster.



THE TWO GREAT PATENTS OF THE DAY.

1.—Improved Mode of Setting Gas-Meters in the Walls of Buildings.

2.—Cast-Iron Mail-Stations for Public Lamp-Posts.

Adopted by the UNITED STATES GOVERNMENT for the Principal Cities.

ALBERT POTTS, Philadelphia, Patentee.

By the FIRST IMPROVEMENT the Meters may be inspected at any time from without, by the agents of the Gas-Company having keys for that purpose. Thus burglars need no longer gain admittance to dwellings under pretense of examining the meters, while they, in fact, examine the fastenings. The meter-box, being neatly and securely imbedded in the front wall, the meter is protected against frost by means of a thick pad on the back of the door. It has been satisfactorily tested in long continued severe weather and found to be eminently successful.

The SECOND IMPROVEMENT speaks for itself. The cities of New York and Philadelphia are already supplied with these boxes, and the convenience to the citizens and increase of revenue to the Post Office Department are most marked. Always in sight, securely fastened to the most public objects, protected by light, day and night, they have become the most popular of all modern improvements and will be immediately adopted throughout the country.

Both of these improvements are to be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, New-York City. For further information address the Proprietor of this JOURNAL, who is authorised to contract for the use of both Improvements, or

ALBERT POTTS, Philadelphia.

MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS.

MANUFACTORIES

SUFFOLK ST. CLERKENWELL GREEN. & ALLEN ST. GOSWELL ST. LONDON

BOSTON, Mass., 1 Barrett Street,—August 2, 1860.

RICHARD GLOVER begs to inform Gas Companies and Contractors that he has always on hand a large assortment of Thomas Glover's (of London) celebrated Dry Gas Meters.

Thomas Glover's Meters have now been in use in the United States and British Provinces, for the last Fourteen Years, and are extensively used by many Gas Companies, to their entire satisfaction; and R. Glover can with all confidence refer to them in proof that Thomas Glover's Meters are— the most Perfect in Principles— the most Correct in Registration—and more Durable than any other Dry Gas Meter made in the United States or Great Britain. R. Glover will at all times be glad to repair any Gas Meters sent him at the above factory. If any of them are of Thomas Glover's manufacture, and of a more recent date than Three years, he will make no charge.

DOWN & MERRIFIELD,

Nos. 340, 342, 344 and 346 West Twenty-second Street, North River, NEW YORK CITY,

MANUFACTURERS OF

WET AND DRY PATENT GAS-METERS,

Pressure-Registers, Pressure-Indicators and Gauges, Station, Show, Customer, and Experimental Gas-Meters, Centre or Hydraulic Valves, Governors, Compensators for Exhausters, and the Standard, Testing Gas-Holders* for Proving Meters, now used in the State of New York in compliance with an Act of the Legislature.

ALSO, BUNSEN'S PHOTOMETER, WITH COMPLETE APPARATUS FOR WORKING THE SAME

* The standard of measurement of this Gas-Holder is given by Professors Torrey, of the U. S. Assay Office; Joy, of Columbia College; Gibbs, of the Free Academy, and several other distinguished scientific gentlemen.

JOHN J. GRIFFIN & CO.,

76 WEST THIRTY-SEVENTH ST.,

NEW YORK CITY,

MANUFACTURERS OF WET AND DRY GAS-METERS,

Station-Meters, Proving-Machines, Show-Meters, Test-Meters, Pressure Indicators, &c.

All of our Work is Guaranteed to be of the First Quality, as well as the material, and for this we can refer to numerous Gas-Light Companies.

JOSEPH LENNIG & CO.,

Nos. 313 & 315 NEW MARKET St., above Vine St., Philadelphia, Pa.,

MANUFACTURERS OF

WET AND DRY

PATENT

GAS-METERS,

STATION,

SHOW, CUSTOMER,

AND

EXPERIMENTAL

METERS.

PHOTOMETERS,

PRESSURE-REGISTERS,

INDICATORS,

AND

GAUGES,

GOVERNORS, METER-PROVERS,

CENTRE-SEALS,

FLUID GAUGES, &c,

The flattering Testimonials we are receiving from Gas Officers, accompanied with expressions of such general satisfaction, and the fact of a tried experience for fourteen years, must present itself as a security to parties desirous of securing the most reliable Instruments. We therefore recommend our Patent Dry Gas-Meter, believing it superior to any Meter manufactured. Messrs. J. Lennig & Co. confine their sole attention to the business of Gas-Meter making.

Our materials are the best in use; the strictest attention is given to workmanship, and we guarantee entire satisfaction to all purchasers.

Purchasers may at any time inspect our Works, and the materials of which our Meters are manufactured. We are fully prepared to execute all orders, upon the shortest notice, and it will be to the interest of parties to call upon us.

☞ Each Meter Tested separately by a Sworn Inspector, and Sealed when desired. ☜

METERS REPAIRED AND FORWARDED WITH DISPATCH.